VOL. XIII. JANUARY, 1927. No. 142.

THE

Telegraph and Telephone Journal.

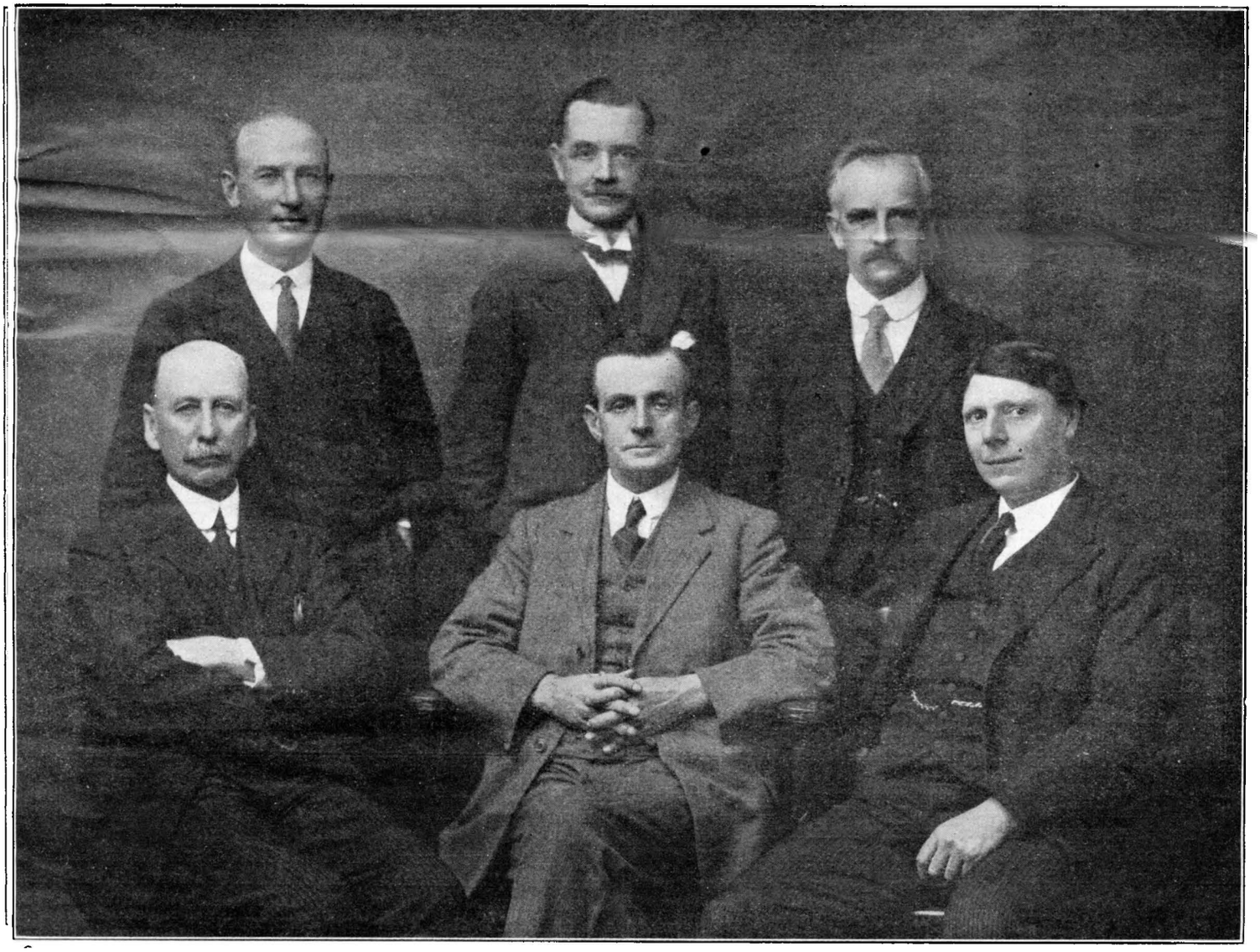
VOL. XIII. JANUARY, 1927. NO. 142.

CONTENTS.

Subscription: To the public, 5s. 0d. per annum, including postage. To the Staff, 3s., including free delivery to any Post, Telegraph, or Telephone Office. Single Copies: To the public, 4d. each, or post free 5d. To the Staff, 3d. each. Orders should be sent to the Managing Editor, TELEGRAPH AND TELEPHONE JOURNAL, *G.P.O. North, London, E.C.1.*

All correspondence relating to advertisements should be addressed to MESSRS. SELLS, LTD., 168, *Fleet Street, London, E.C.4.*

TELEGRAPH AND TELEPHONE MEN AND WOMEN.



XXXVI.—"OURSELVES." [*Photograph by Miles & Kaye.*

(*Standing*) J. STUART JONES. W. H. GUNSTON. J. J. TYRRELL.
(*Sitting*) W. A. VALENTINE. JOHN LEE. J. W. WISSENDEN.

OURSELVES.

(*See preceding page.*)

THIS, we consider, is a useful picture. We should be glad to say that it was ornamental also, but that must be for others to say, if they are sufficiently unscrupulous. At any rate, we have a certain pride in the assembly. At first we were a trio only, but we have expanded since then, and the group as it appears has been responsible for the direction of this journal for some years. We have had our ideals throughout and though we are conscious of some failures we are not conscious of downright failure. The middle territory is uncertain, but it is in that insecure land that we find ourselves. The little party is breaking up and those of its members who pass away are proudest of the fact that the journal itself will continue. There will be new things to record, new ventures, new achievements and of these the venerables of the group can only dream. But the journal has kind friends throughout the world, friends of different races and of different tongues, and to all who are bound by the fraternity of telegraphy and telephony Ourselves, in our last corporate utterance, send kindly greeting.

OVERSEAS COMMUNICATIONS.

MR. H. G. SELLARS, of the Cable Room, C.T.O. supervising staff, gave an interesting lecture, illustrated by over fifty lantern slides at the Institute of Electrical Engineers, London, on the 20th ult., under the auspices of the London T. and T. Society.

If Mr. Sellars was not favoured with a larger audience than that which gathered to listen to him it was undoubtedly due to the awkward date of the fixture which happened to fall in Christmas week, with all its Postal, Telegraph and Telephone pressure, not to speak of that other seasonal pressure (upon paterfamilias by materfamilias) to assist in festive shopping. However, some of us managed to escape and were not unrewarded for our audacity!

The lecturer's subject was well arranged, if it suffered a little from a certain amount of overweight in detail, the omission of which would not have detrimentally affected the main theme of his subject, i.e., the development of international, colonial and world-wide telegraphic communication from the laying of the first thin copper thread across the Atlantic up to the present day, with the more modern methods of communication through the medium of the ether.

The discussion which followed was equally interesting, and perhaps the lecturer's success was most pronounced in its thought-provoking effect. If it had done no more than raise the issue, ably voiced by Mr. Stuart-Jones, of the very serious present-day problem of the economic relationship between wireless and long-distance submarine cable working, it was well worth all the trouble of compiling and delivering.

It, however, did more. It must have given thought to those who were not in close touch with the evolution of telegraph apparatus. This feature was quickly seized upon by Mr. Pink, who expressed his personal regret that it had not been possible for a larger number of telephone enthusiasts to foregather so that they might have seen something of the path by which the telegraph craft has had to grope its way.

Mr. Day enlarged on the immense strides which electrical communication had made, practically in a century, and Mr. Shaughnessy, the ever-happy chairman, whose cheeriness no paucity of attendance, no adverse conditions and no criticism can ever disturb, contributed not a little to the brightness and the enlightenment of the gathering.

Mr. Sellars' replies to the critics were generally to the point, never failing to accept correction, but never yielding when on good ground.

J. J. T.

TELEPHONE DEVELOPMENT OF THE WORLD IN 1925.

BY W. H. GUNSTON.

THE telephone development of the world during 1925 followed much on the usual lines. The total number of telephones increased as during the two previous years by about a million and a half, the precise figure (as far as an estimate can be precise) being 1,602,000. Of this increase 846,000 was provided by North America, and 610,000 by Europe—by far the largest increase yet recorded for that Continent.

The total figure is distributed over the six continents thus :—

	No. of Telephones Dec. 31, 1924. (Thousands.)	No. of Telephones Dec. 31, 1925. (Thousands.)
Europe	6,842	7,452
Asia	863	912.5
Africa	153	165.5
North America	17,370	18,216
South America	362	394
Australasia	478	530
	26,068	27,670

It is interesting to observe that whilst North America is increasing at the rate of 5% Europe is increasing at the rate of 9% and it may be pointed out that as these percentages were rather over 5 and 8 respectively last year, Europe is at last beginning, though very slowly, to gain upon America. It is not unfair to surmise that, with many States so much underdeveloped, Europe will continue for some years to show a rising percentage of growth whilst that of America slightly contracts.

The number of telephone stations per 100 of the population in the chief telephone-using countries at Dec. 31, 1925, was as follows :—

United States	15
Canada	13
Denmark	9.5
New Zealand	9.4
Sweden	7.2
Australia	6.8
Norway	6.6
Switzerland	5.6
Germany	4.3
Great Britain	3.1
Netherlands	3
Austria	2.3
Belgium	2.2
Argentina	1.9
France	1.8
Japan	1

The figures in the following tables are based chiefly on recent official information. In some cases (marked *) estimates have been resorted to (based in most cases on last year's official figures). The statistics for South America are founded on information relating to the previous year obtained from America. As the growth of the telephone in South America is fairly regular, the estimates given may be taken to approximate closely to the actual telephone development. The only other important country in which an estimate has been employed is Japan, where an increase of about 30,000 telephones has been allowed for. In 1924, 40,000 telephones were added, so that the estimate would appear to be a conservative one. The figures in brackets following the names of countries in the annexed tables represent the number of telephones in existence at Dec. 31, 1924.

EUROPE.

The ratio of inhabitants to telephones in Europe is 1 to 64. In order, however, to get a fairer idea of the development of Northern and Western Europe, it is convenient to take an area comprising Scandinavia, Germany, Austria, Switzerland, France, Holland, Belgium, Great Britain and Ireland. It will be found that this area comprises 6,390,000 out of the 7,452,000 telephones in Europe and 183 out of its population of 475 million yielding a ratio of 1 telephone to every 29 inhabitants. The principal increases in growth are to be found in Russia, 48,370 telephones (30%); Belgium, 21,278 (over 15%); France, 75,159 (over 11%); Great Britain, 115,632 (9%); Germany, 202,839 (over 8%); Switzerland, 10,491 (over 5%); Holland, 11,452 (5%); Sweden, 16,276 (nearly 4%).

As is to be expected, the countries with the highest development show the lowest rate of progress. Denmark, for example, had an increase of 7,816 telephones (less than 3%), and Norway about 6,000. Russia, on the other hand, with much leeway to make up, comes first with her increase of 30%.

	No. of Telephones	Population (thousands)	Inhabitants per telephone
Austria (144,884) ...	152,751	6,535	42
Belgium (135,024) ...	156,307	9,077	45
Bulgaria (8,097)	8,531	4,861	570
Czecho-Slovakia ...	115,487	13,588	119
Danzig (17,280)	17,707	356	20
Denmark (303,754) ...	311,570	3,283	10.5
Esthonia (9,926) ...	11,000*	1,250	114
Finland	85,000*	3,402	40
France (642,851) ...	718,000	39,209	54.6
Germany (2,385,177) ...	2,588,016	59,858	23
Great Britain (1,275,524)	1,391,156	44,173	31.8
Greece	5,500*	6,800	1,236
Hungary (79,952) ...	80,058	7,482	93
Iceland	3,642	94	26
Ireland (21,540)	23,112	3,139	136
Italy	175,000	38,500	220
Latvia (15,256)	18,411	2,000	109
Lithuania (6,171) ...	6,400	2,000	312
Luxemburg (7,320) ...	7,957	263.8	33
Netherlands (204,676) ...	215,928	7,029	32.6
Norway (167,000) ...	173,000	2,649	15
Poland (119,985) ...	125,000*	13,000	104
Portugal (20,500) ...	21,344	6,399	300
Russia (158,425) ...	206,795	136,000	700
Rumania (34,580) ...	41,675	17,000	408
Spain	120,279	21,658	180
Serbs, Croats and Slovenes (27,457)	28,600*	11,600	406
Sweden (418,318) ...	434,494	6,036	13.6
Switzerland (186,297) ...	196,788	3,888	19
Saar (15,900)	15,900*	—	—
Turkey (9,801)	10,325	2,000	194
	7,464,000		
Deduct for Siberia, Turkestan, &c.	12,000		
Total	7,452,000	475,000	64

ASIA.

	Telephones.
Ceylon (6,448)	6,500
China	110,000*
Dutch Indies	41,392
French Indo China (3,361) ...	3,500
Japan (573,144)	600,000*
Chosen, Formosa, Quantung, Saghalien, &c.	60,000*
India (42,170)	44,991
Iraq (731)	752
Palestine (1,760)	2,227
Persia, 1924	2,445
Phillipines	16,000*
Siam	1,877
Straits Settlements, 2,038 (including Singapore, 5,154)	7,192*
Federated Malay States	4,228
Siberia, Turkestan, &c.	12,000*
Total ...	912,500

Population 1,013,000,000 or 1 telephone per 1,111 inhabitants.

AFRICA.

	Telephones.
Algeria (21,582)	23,000*
Egypt (33,009)	34,950
Tunis (7,091)	7,500
Guinea, Portuguese	6,000
Gold Coast	500*
Madagascar (1,051)	1,200*
Mauritius	1,165
Morocco (6,042)	6,500*
Senegal	436
Tripoli	367
South Africa (73,825)	78,571
Kenya	1,391
S.W. Africa	1,056
S. Rhodesia	1,981
Total ...	165,590

Population 143,000,000 or 1 Telephone to each 885 inhabitants.

(To be continued.)

DEATH OF MR. W. C. OWEN OF BATH.

MR. OWEN had been in failing health for some time, his illness towards the end becoming very painful, and he was latterly almost totally blind. He was well-known in Bath and the surrounding district on account of the position which he held in the telephone service. Born at St. Asaph, in North Wales, he was educated at Liverpool College, and, after holding various appointments in commercial offices at Liverpool, entered the service of the United Telephone Company in 1882. On Nov. 1, 1885, he was appointed local superintendent for the Gloucestershire Telephone Centre of the Western Counties Telephone Company, and was subsequently promoted district superintendent over the combined Gloucestershire, Worcestershire, Herefordshire, and Shropshire telephone centres, with headquarters at Cheltenham. In 1892 the various telephone companies throughout the country were amalgamated. This resulted in a rearrangement of the districts, and Mr. Owen was transferred to Cambridge as district manager for the Cambridgeshire, Hertfordshire, and Bedfordshire centres, and in the following year he was appointed district manager for the whole of Kent, with control of the Canterbury, Margate, Dover, Chatham, and Tunbridge Wells centres. In 1897 Mr. Owen was transferred to the London staff of the Engineering Chief, in which position he gained much valuable technical experience. In 1898 he was appointed district engineer for the North of Ireland, with headquarters at Belfast.

Whilst holding this position he planned and carried out the work of re-constructing the entire telephone system of the city of Belfast, substituting an underground for an overhead plant and organising the removal of the exchange to a new situation.

In January, 1902, Mr. Owen commenced business on his own account as an electrical contractor, and in 1904 he accepted an offer made by the National Telephone Company to rejoin the service as local manager for the Bath, Radstock, and Wiltshire telephone areas. In 1912, when the National Telephone Company's business was acquired by the State, he was appointed to the engineering department as local engineer for the Bath centre. This position he held until Feb. 28, 1922, when he was superannuated after having completed 40 years in the service of the public.

Mr. Owen had a wide knowledge of all matters pertaining to the telephone service, and was the author of a book published in 1903 by Whittaker & Co. dealing with telephone lines and methods of construction. This was the first book of its kind to be published, and had a large and world-wide circulation. He was also a frequent contributor to technical journals on matters relating to telephony and kindred subjects.

TELEGRAPHIC MEMORABILIA.

A HAPPY NEW YEAR !

TELEGRAPHICALLY 1927 should prove a very happy new year for this country for, long before its close the whole British Empire should be knitted more closely by the intangible ties of Radio communication and be in instant touch by day and night with the mother city.

1926 saw the Canadian Beam service a daily working fact, and the Australian Beam full of a promise sure of fulfilment, with South Africa and India well on the way.

But while writing and thinking of the Beam service one is liable to forget the mighty station at Rugby with its

(1) Long-wave plant of world-wide range ;

(2) Long-wave plant of medium range ;

(3) Short-wave plant of world-wide range ;

and its experimental telephone plant of, say, three to four thousand miles range.

The prophecy concerning this station made in May last before the Royal Institution by a distinguished Doctor of Science was to the following effect " the ultimate aim of this experiment is to connect any telephone subscriber in this country to any subscriber in the United States and Canada. By aid of the telephone circuits already constructed between England and the Continent it may be found possible later to connect anyone in Western Europe to anyone in North America through Rugby. The Rugby station when in full swing will probably be able to transmit simultaneously three long-distance telegrams and a telephone message."

On November 22, Viscount Wolmer stated in the House of Commons that the cost of the Rugby wireless station, including the site, building, buildings and plant, was about £480,000.

Huge as this sum may appear to the average reader, it is little more than half the cost of the Bordeaux station, built by the French in 1919, which only gives a single service, against the multiple service of the British station.

The latter has also cost much less even that the new stations of St. Assise, near Paris, and that on Long Island.

Another feature of startling contrast however, is the fact that the estimate for the four Beam stations in this country is actually less than half the cost of Rugby. Nevertheless we come back to the thought that if the developments anticipated in the Beam system should materialise and the modifications and additions necessary for the rapid changing of wavelengths become a working possibility, then will have to be faced the extra cost for these elaborations. As was quoted in our last issue on this subject the very changes necessary to give this pliability to the working of directed short waves, " might at the same time make the short wave plant as costly as that of the long wave plant."

Yet another side of this matter, and that the *un*directed short wave which is already being utilised by certain ships, as my wireless amateur readers have no doubt already noted.

On an Atlantic greyhound one could hear the traffic spinning out reliably on a low two-figure wavelength and with a power something in the neighbourhood of one thousandth less than that used by long wave stations utilised for the same distance. Thus these three phases of long wave, directed short wave and undirected short waves present an interesting puzzle for the scientists and economists for some time to come.

Great Britain has already commenced to gain what should prove most valuable information with the varying types of radio communication at present in use and to come.

A Special Correspondent of the *Westminster Gazette* appears to have had *special* facilities for handling the Christmas traffic dealt with by means of the new Anglo-Canadian Beam service judging from the following excerpt from the columns of the above-mentioned London daily newspaper.

One wondered how far the law regarding the divulgence of the contents of a telegram was overcome in this particular case. The latest information, however, is to the effect that the forgiving spirit of Yuletide was extended to the lady or gentleman who had the bold and happy inspiration to prepare this picturesque snap-shot of Christmas, 1926, in the C.T.O., London.

" ' Cheerio. All the best.'

" This was one of hundreds of Christmas greetings sent by cable and wireless across the Empire's seas from the Central Telegraph Office of the G.P.O. yesterday.

" An operator flicked it out on a typewriter keyboard, and it was flashed across the Atlantic from the Bodmin beam station to Montreal. Two people, thousands of miles apart, had shaken hands through the ether and wished each other a happy Christmas.

" I picked up a few of the slips. They were all happy variations on the ' Fondest Greetings,' ' Christmas Greetings,' and ' Happy Christmas, Love ' theme, and were bound for out-of-the-way places one had never heard of —Melaval, Fairville, Tranquill, St. Stephen, Coquitlam, Rosedale.

" Where was Coquitlam ? Was it on the map at all ? Would they have Christmas trees there, and Christmas pudding ? Wherever it was, someone in England had said to somebody there : ' Happy Christmas, Love.' "

The " F " Division has again to be congratulated upon the success of Messrs. Johnson and Young in designing and reproducing yet another First Favourite in their Xmas and New Year's Card, which is perhaps at its best in the scene depicting the village sub-postmaster who has " a little difficulty with his Tele-Type," and who, with a fair-sized hammer, a huge oil-can and a tin-opener is evidently more than ordinarily anxious as to the next move.

The skit on the Beam is remarkably well thought out and executed. Altogether an excellent result in black and white.

NEW BEAM STATIONS.—New beam stations for communication with New York and South America are to be erected by Marconi's Wireless Telegraph Co. A station is also to be erected in Portugal to connect Lisbon with Portuguese colonies in Africa.

The W. India and Panama Telegraph Co., Ltd. report that the receipts for the year ended Dec. 31. 1925, amounted to £48,898, and that there is a debtor balance of £18,328. After crediting interest and providing for debenture interest, &c., there is a debit of £28,710, which is being added to the adverse balance of £105,900 brought forward. Considerable economies have been effected and the rates have been changed in certain respects.

The report of the Western Telegraph Co., Ltd. for the year ended June 30 last, records a revenue of £1,541,100 and working expenses amounting to £839,881. The balance, after providing for debenture interest and income tax, is £590,626, and to this is added £300,440 brought forward, making £891,066. Of this, £250,000 has been transferred to general reserve, four dividends of 2½% each, free of tax, have been paid, and a balance of £329,171 is carried forward. The directors have appointed Vice-Admiral H. W. Grant, C.B. (joint managing director of the Eastern Telegraph Co., Ltd., and a director of the Eastern Extension, Australasia and China Telegraph Co., Ltd.) to a seat on the board.

WHO IS RIGHT ? CABLES *v.* WIRELESS.—The Sydney correspondent of the *Daily Telegraph* reports that Mr. J. A. J. Hunter, member for Maranoa in the House of Representatives, has stated that the speed of the new duplicated Pacific cable is 1,000 letters a minute, and contrasted this with 500 letters by the " beam " radio system from London to Montreal. Mr. E. T. Fisk, managing director, Amalgamated Wireless (Australasia), Ltd., retorts that the guaranteed capacity of the beam service from London to Montreal is double Mr. Hunter's figure. In actual practice, in a seven days' continuous test, the average working speed was 1,200 letters a minute for a 24-hours' day. Speeds of 2,500 letters a minute were worked on a complete circuit for many hours. Mr. Fisk states that this shows considerably greater capacity than that claimed for the new cable. Let us leave the two protagonists to continue the debate !

ARGENTINA.—According to the *Review of the River Plate*, the company operating the service of wireless-telegraph communication with Europe recently entered into the enjoyment of several valuable extensions of privileges. On Sept. 17, the Government issued a decree authorising the " Compañia Radio-telegrafica Argentina Transradio Internacional " to establish communication with stations outside of the Republic at a greater distance than 1,000 kilometres from the Federal Capital. The original concession did not permit communication with any country co-terminous with Argentina, but the new ruling only excludes communication with Uruguay. The original concession also only allowed communication with " fixed " stations, but the company may now communicate with shipping outside the 1,000-km. radius from Buenos Aires. The company is no longer restricted to the use of long waves, but may transmit on waves of any length subject to subsequent Government reservations of particular wavelengths. Immediate advantage of the new privileges has been taken. A short-wave transmitter has been added to the Monte Grande station and is now operating. A direct service to Rio de Janeiro and Southern Brazil has been in operation for nearly two months, and the company is to institute a service to ships anywhere in the Atlantic.

AUSTRALIA.—According to the *Electrical Engineeer of Australia and New Zealand*, the Associated Radio Co., which operates broadcasting station 3AR, Melbourne, reports a net profit of £3,774 on its operations for the year ended June 30, 1926. This was obtained after a drastic writing down of stock values, providing for contingencies and writing off £452 for depreciation. The company has had an anxious time during the few years of its existence, but the future is distinctly brighter. In accordance with the recommendations of the consulting engineer, Mr. Donald Macdonald, it is proposed to install a new transmitter of about 5 kw. capacity and to make general improvements to the studio, programmes, and general broadcasting.

During the month of September the number of broadcast radio receiving licences issued in the Commonwealth was 19,530, making the total in force 165,436, of which 44,962 and 83,077 were accounted for by New South Wales and Victoria respectively.

Reuter's Agency in Melbourne says that at a conference of the Federal Wireless Institute of Australia at Sydney, Prof. Madsen, professor of electrical engineering at the University of Sydney, emphasised the need for the appointment of a board of wireless research, similar to that which was created in Great Britain in 1920. The conference endorsed the proposal, and it was also unanimously decided that the Institute should appoint three delegates to the world Conference at Canberra at the opening of the Federal Parliament next year.

BELGIUM.—Reuter, Brussels, reports that the National Telegraph and Telephone Co., which the Government has been thinking of establishing on the model of the National Railway Co., will not be set up. A scheme is now contemplated for setting the telegraph and telephone systems on an independent basis both in respect of finance and control, thus putting matters on a business footing and permitting loans to be contracted, secured on the plant of the undertaking.

BOLIVIA.—Five broadcasting stations are to be built in Bolivia, says *The Electrical Review*. According to information received by the Bolivian Legation in London, they are to be erected at Sucre, Potosi, Tarija, Monteagudo, and Azurduy, and the Finance Committee of the Bolivian Chamber of Deputies has voted 150,000 bolivianos, equal to £11,875, to cover the cost. A successful radio club has been in existence for some time at La Paz, and a regular programme is broadcast, but this is a private venture, and is financed by members' subscriptions. The new stations are to be controlled by the Government.

BRAZIL.—Reuter's Trade Service informs us that a radio station has been opened at Olinda, in the State of Pernambuco; Olinda has a population of over 8,000, and other towns within the area of the service are Bezerros (17,500); Bomjardim (40,000); Brejo de Madre de Dios (13,650); Garanhuns (35,000); and the increasingly important port of Victoria (33,000).

BULGARIA.—From the same authority's agency in Sofia we learn that the Bulgarian Cabinet has authorised the Board of the Bulgarian Post Office to erect another wireless-telegraph station in the neighbourhood of Sofia. A credit of 15,000,000 leva has been set aside for the purpose, and the work will be carried out under an agreement to be arranged between the Post Office and a contractor.

BURMA.—The London *Times* reports that the first system of wireless telephony in Burma has been established between the office of the Rangoon Port Trust and the pilot vessel in the Gulf of Martaban. The telephone has a device by which either party can call up, and is capable of communicating with vessels for a distance of 200 miles.

CHINA.—Despite the present disturbances in China there is a decided increase in the interest manifested towards broadcasting in Hong Kong of late, and the Government has introduced a new Bill relating to wireless telegraphy. It is intended to make a fee for a receiving set approximately $2.50 per annum.

EGYPT.—The Marconi Radio-Telegraph Co. of Egypt is being formed to take over the Abu Zabal wireless station, near Cairo, which was originally built as one of the links in the Imperial wireless "chain," and has been operated by the British Government from the time of its opening in May, 1922, until now. It was the link between the Leafield station and that at Karachi. Now that the Rugby station has been built and the Imperial system changed, says *The Times*, the Egyptian station is no longer of importance to the Government, which has accordingly disposed of it to the Marconi Co. In addition to communicating with Karachi, this station communicated with Palestine, Iraq, and Abyssinia.

FINLAND.—A plan for the erection of a broadcasting station has been worked out under the guidance of the Ministry of Communications, according to *Commerce Reports*. The project involves a station of 25 kilowatts capacity, with a wave-length of 1,500 metres, and among the sites mentioned the towns of Lahtis and Tavatehus are most prominent. It is estimated that at least two years will be occupied in the preparation of the station.

FRANCE.—In connexion with the new broadcasting station which is to be erected, a Reuter message from Paris states that the Union of Radio-Electric Industries proposes to erect the station at some distance from Paris in order that receiving posts may be caused no inconvenience. The power of the station will be 60 kw., that is to say more powerful than Daventry. It is proposed to transmit performances at the Opera Comique and the Comédie Française, lectures at the Sorbonne, and notable speeches. It was at first proposed to utilise the Eiffel Tower, but the idea was abandoned for several reasons. First, a station within Paris itself would make reception there difficult; secondly, the tower is utilised for transmitting messages in Morse; and finally, it belongs to the State, which is not prepared at present to establish a new station.

The Times reports that there is a very interesting controversy going on just now in Paris, where the three stations, Eiffel Tower, Radio Paris, and P.T.T. derive part of their incomes from broadcast commercial publicity. The trouble at present is due to the fact that the Eiffel Tower is being severely censored for this publicity work, and the Minister of Commerce has gone so far as to commission a special censor with instructions to cut off the transmission when any broadcast is made which might be taken as publicity.

GERMANY.—The Glisoma-Werke Schierstein on the Rhine, formerly known as Landsberg and Ollendorf, of Frankfort, is manufacturing a new insulating material known under the trade name of "Peralit," says *Commerce Reports*. The new product is intended to replace fibre, hard rubber, and other insulating materials. It is built up of layers of certain materials, the nature of which is not reported, and subjected to very high pressure with application of heat. The insulating material has a high electrical resistance, and is said to keep its shape up to 200° C. It is not affected by oil, air or humidity, and is only affected by certain acids.

The French military authorities have given permission for the erection of a wireless broadcasting station in the Palatinate. The station will be erected in a central part of the province, and the Post Office authorities expect to put it into operation within the next six months. The wavelength is not yet announced.

Reuter's Agency at Mainz says that the new wireless station for the Rhineland, situated in Elberfeld, near Barmen, has been tested by the Postal authorities and handed over to the broadcasting society. Trials will be made forthwith, and it is hoped to have the station in full operation before Christmas.

GREAT BRITAIN.—The *Daily Mail*, London, reports the following case of a "pirate" wireless offender who had evaded detection for more than twelve months:—"A station which transmitted under the call signals 60K and 5UH having been located by Manchester Post Office engineers after a search lasting more than a year, the owner of the unauthorised "station" Cyril J. Smith, of Timperley, Cheshire, was fined the maximum penalty of £10, with £5 costs, at Altrincham, on a charge of having worked apparatus for wireless telegraphy without having a licence. The magistrates also ordered that his apparatus should be forfeited. Smith said he first applied for a transmitting licence in 1924, but received no reply, and then again in November, 1925. He offered to send prints of his intended patents, but, receiving no reply, he was tempted to carry on his experiments. He had had numerous letters to the effect that his application was being considered."

The Wireless Telegraphy (Blind Persons Facilities Bill) was recently read in the House of Commons. This Bill proposes that when a person satisfies the Postmaster-General that he is a blind person within the meaning of the measure, a licence to establish, maintain, and work a wireless-telegraphy station for the purpose of receiving messages *only* may be granted to him subject to such terms, conditions, and restrictions as the Postmaster-General may think fit, but without payment of any fee.

During recent manoeuvres with the Regular Army, the 23rd (London) Armoured Car Company, a Territorial unit of the Royal Tank Corps, carried out extensive and highly successful tests in radio-telephonic transmission between moving armoured cars. Storage batteries, supplied by Messrs. Peto & Radford, were used for running the 1,000-volt generator and for lighting the filaments of the valves in the transmitting and receiving sets, and though treated with little respect and continually subjected to the jolting motion of the cars, played their part throughout without a fault.

The following interesting particulars were mentioned regarding the British Broadcasting Company recently in the House of Commons in relation to its present and future position by the Postmaster-General, Sir W. Mitchell-Thomson:—On March 31 last there were 1,964,000 licences; on Oct. 31 there were 2,097,000, and it was estimated that if trade revived there would be on March 31 next 2,200,000 licences. It was anticipated that the Corporation would receive in its first financial year £805,000, and if the listeners increased by another 200,000 in the following year, the Corporation would receive £866,000. The State would retain £159,000 this year; next year it would retain £245,000, and the year after £271,000. For the three months from January 1 next to March 31, the Corporation would receive £183,000.

Questions and Answers and the House of Commons.—On Nov. 17, Mr. Pilcher asked the Postmaster-General whether he had any information regarding the interference with ordinary wireless receiving which had resulted in Cornwall from the operation of the new beam system of communication with Canada; and whether, if so, he would approach the Marconi Company, with a view to the protection of the interests of owners of private receiving sets.

Sir Wm. Mitchell-Thomson stated that the operation of the Post Office beam station at Bodmin did not interfere with broadcast reception in Cornwall, provided that suitable receiving apparatus was used. Some interference had been experienced by persons in Cornwall conducting experiments in transmission and reception on short waves, but he was afraid that that might be unavoidab.e.

SOUTH AFRICAN BEAM STATIONS.—On Nov. 23, Sir W. Mitchell-Thomson informed Sir. H. Brittain that the beam stations for communication with South Africa were practically completed, and preliminary tests had been carried out by the contractors. The tests indicated that the use of shorter wavelengths than those for which the stations were originally designed would probably give a better and more continuous service, and the aerials were accordingly being adjusted to enable those shorter wavelengths to be employed. The contractors anticipated that the necessary alterations could be effected in about seven weeks. Tests under the new conditions would then be necessary before the service could be opened to the public.

The information in the last reply is particularly interesting in view of the belief by many that the even shorter waves than those at present in use, say well below 30 metres, are likely to prove specially effective.

HOLLAND.—Reuter's, of Amsterdam, gives the following account of the service of broadcast radio-telephone distribution by ordinary telephone and wired wireless which was recently inaugurated by the Municipal Telephone Administration at The Hague and has already afforded daily pleasure to some 200 subscribers, who, it is stated, are loud in their praises of the new scheme. Some thousand applications have been received from would-be subscribers, who are being linked up at the rate of 15 per day. It is declared that the new scheme is working successfully; the only disturbance so far experienced is from the electric tramways, but is negligible. Full agreement has not yet been reached with transmitting authorities, but it is hoped that a definite licence for the receipt of wireless programmes will be secured after the December meeting of the Council of the International Radio Bureau in Geneva. From a juridical standpoint the Hague Municipal Telephone Administration is not committed to anything, but the Postal and Telegraph Administration intends to extend this service in the near future to the Government telephone lines.

Each subscriber has, as an attachment to his telephone installation, a small box containing inexpensive apparatus to which either earphones or a loud-speaker can be connected. The annual charge for the service is 30*s*.

The Netherlands Postal and Telegraph Administration announces that it has been definitely decided to erect a new transmitting station at Scheveningen, and that it will be available for use at the beginning of the year. The energy and depth of the modulation will not be any stronger than is necessary to make the spoken word easily audible throughout the country with the aid of a valve set and a loudspeaker. The wave-length will be 1,950 metres.

HUNGARY.—Next spring, says Reuter's Agency at Budapest, the Hungarian Postal Administration intends to construct a new broadcasting station which will be much more powerful than the present station. Like the old one, it is to be erected on the island of Csopel. As a result of its construction, an increase in the number of subscribers is expected, particularly in the provincial districts. If necessary, it will be possible to raise the transmitting power of the new station to the level of the largest European stations.

INDIA.—*Indian Engineering* states that the Board of Trustees for the Improvement of Calcutta has considered an application from the Indian Radio Telegraph Co., Ltd., stating that the proposed rental of Rs. 1,000 for the land required for the broadcasting station in the Cossipore-Chitpore open space is prohibitive and asking the Board to make a reduction. After some discussion it was decided to offer the site at a rental of Rs. 250 per month for the first two years of the lease and Rs. 500 per month for the remaining period. The company proposes to establish its station in Bombay next cold weather. The company has applied for the lease of a plot of land in the new public park laid out by the Western India Turf Club.

The Postmaster-General of Burma announces that the wireless station at Victoria Point, the extreme southern tip of the Province of Burma, was to be reopened on Dec. 1, 1926. The discontinuance of this station since February, 1925, has been severely felt by shipping in the Bay of Bengal. There are no land telegraph or ocean cable lines between Rangoon and Victoria Point, and the wireless station is the only means of communication along that part of the Burma coast.

ITALY.—VOLTA CENTENARY.—In connexion with the celebration of the *first centenary of the death of Alessandro Volta, an International Congress on* Telegraphy and Telephony will be organised at Como. Particulars can be obtained from the Italian Ministry of Communications (Istituto Superiore P.T.T.), Viale del Re 131, Rome.

IRISH FREE STATE.—A manufacturer of batteries is now negotiating for the formation of a company in Dublin for the entire manufacture of these articles there, not alone for wireless, but for all other purposes. Wireless apparatus is being made in the Free State, and is being purchased in preference to imported makes.

MEXICO.—*The Electrical Review* informs us that the Mexican Government has provided over $8,000,000 for the modernisation of the telegraph and radio-communication services.

PERU.—From Arequipa, Reuter's Trade Service reports that a broadcasting station has been opened at Arequipa (population 37,000), capital of the Arequipa Department, which has a population of nearly 300,000. The station operates under the auspices of "OAX Lima," and transmits on a 275-metre wave. A concession has been granted to Señor Luis Ansiaux for a larger station, which will operate jointly with this one.

From the Lima agency of the same company we also learn that the Government has cancelled the radio monopoly in Peru, and it will now be possible to import and sell radio apparatus without any restrictions. The broadcasting operations have been entrusted to the Marconi Co. for the account of the Administration. The licence fee for each receiving set is £P1.

The monopoly for the importation of radio apparatus into Peru, held for some time by the Peruvian Broadcasting Company, was cancelled by the Government in October. Importation is thus freed from restrictions, apart from a duty of 0.50 sol per kg.

PORTUGAL.—An international radio-telegraph service will shortly be inaugurated, says Reuter's Agency, in Lisbon, by the Companhia Portuguese Radio Marconi between Lisbon, the Azores, Madeira, Cape Verde, Angola, Mozambique, and North and South America. There will, of course, be connexions with the whole world through the radio centres of Paris and London.

RUSSIA.—An English technical journal says that it is reported that a new broadcasting station is to be built in the Kaschira-Schatura district, the power of which will be 1,000 kw.

SCOTLAND.—NAVIGATIONAL RADIO-TELEPHONY.—CLYDE INSTALLATION.—The Clyde Lighthouses Trustees are to proceed with the installation of wireless-telephone apparatus on the Little Cumbrae to establish communication between the lighthouse on the island and Toward. The cost is estimated at under £700 and the annual expense at between £5 and £10. Instead of a continuous call-bell system, it is proposed to fit clocks to automatically switch in the call-bell every half hour, and with this arrangement it will be possible to make calls every half-hour, day or night.

SWEDEN.—*It is reported that the new broadcasting station, which is* being erected at Motal, will be completed by next spring. The *Daily Telegraph* states that the masts will be about 380 ft. high and the power used will be 120 kw., according to the German method of calculation. The transmission equipment is being delivered by Marconi's Wireless Telegraph Co.

SWITZERLAND.—An official report lately issued shows that at the end of 1925 the length of the telegraph and telephone lines in operation in Switzerland was 19,296 miles, with a total conductor length of 567,364 miles. During the year 1,144,434 inland telegrams, 1,981,893 outgoing and 1,976,893 incoming foreign telegrams, and 1,200,219 transit messages were handled, the total of 6,303,266 showing an increase of 1.16% over 1924. The report shows that the telephone service is making greater progress than the telegraph in Switzerland. There are now nine first-class exchanges with 11 sub-exchanges, 53 second-class, and 1,015 rural exchanges in the country. At the end of the year automatic exchanges were in operation at Zurich-Limmat (3,000 connexions), Zurich-Tiefenbrunnen (700), Lucerne-Emmenbrucke (200), Lausanne-Mezieres (70), and St. Gall-Winkeln (50). On an annual income of £2,140,292 the Swiss Telephone Department showed a net profit of £203,574, *whereas there was a loss on the telegraph service of £145,252.*

TURKEY.—IMPORT DUTY ON WIRELESS SETS BASED ON THEIR WEIGHT!—Constantinople, says Reuter, is shortly to have a broadcasting company of its own, and considerable progress has been made with the organisation and technical preparations. *The studio in the Central Telegraph Office in Stamboul* is quite ready, but it has not yet been linked by wire with the broadcasting station at Osmanieh, ten miles outside the town; nor is the latter quite complete, although another fortnight should see the beginning of trial emissions. The local subscription is to be, roughly, one guinea per annum. The company is endeavouring to obtain simplification of the present regulations affecting the installation of wireless sets. At present one has to apply to Angora, and after giving evidence of probity and furnishing various guarantors one may obtain a permit in exchange for an undertaking that the set will be at the disposal of the Government if the latter requires to requisition it. There is apparently no difficulty about importing sets, on which a tax based on their weight only is payable.

UNITED STATES.—Automatic operation of one of its transmitters has been developed by the Schenectady radio station of the General Electric Company of America. The best supervised transmitter is liable at times to go wrong, and there is always the chance that a break will occur during an important programme. At WGY a daily inspection of the valves is made; the 50 kw. transmitter, located about four miles from the control room and studio of the station, has 50 valves of one sort or another, and the failure of any one means a shut-down. Occasionally the cause of trouble is not immediately apparent, and at such times the spare 5 kw. transmitter, located a quarter of a mile from the control room, may be automatically operated by an ingenious series of 15 relays, controlled over three lines between control room and transmitter. The control-room engineer throws a switch, which starts the nine machines supplying the various types of current to the transmitter. A second switch supplies low-plate voltage, and the attendant may then consult an indicating device in the control room to find out if the transmitter is functioning properly before he throws a third switch, which puts the transmitter on full power. There are interlocking relays which automatically control the flow of water used for cooling the power valves, and these relays will automatically shut down the set if any part fails to operate. The switch-over from one transmitter to the other can be made in 15 seconds. While automatic operation may be continued indefinitely, it is customary to assign an operator to the set as soon as possible after the switch-over has been made.

The following much-condensed report of a paper read by Mr. R. Falshaw Morkill, before the Institute of Transport is particularly interesting as showing how modern electrical developments have changed what at one time was the independent department of Signals even on large railways, into part of a huge complex organisation in which the need for co-operation and co-ordination are absolute essentials of successful working and yet how this organisation may differ in different countries and yet give effective service under each of the systems. Said the lecturer:—

"A railway signalling organisation does not cause much inconvenience until the introduction of the modern methods of signalling, power, track circuiting, and automatic. In new countries and on new railways the tendency has been to keep everything that appertains to signalling under the signal engineer, or to combine the duties of the signal engineer and telegraph superintendent. The railway electrical engineer is also concerned, being the medium through which electrical energy is furnished for power signalling, but there should be no duplication of responsibilities in his direction. On the Canadian Pacific Railway the system is divided into two districts, east and west, and a signal engineer for each acts as an advisory officer and prepares plans and estimates for new works. The actual maintenance work is the responsibility of signal supervisors. The signalling staff has no jurisdiction over the telegraphs and telephones, or over the lighting of the stations or yards."

"On the Pennsylvania, U.S.A., Railway, the system is organised on a divisional basis. There is a chief signal engineer and a general superintendent of telegraphs for the system, but the regional signalling officers have also charge of the telegraphs and telephones. In the case of the Queensland Government Railway, the signal engineer is responsible for the general policy of signalling, station, and yard lighting, and for new constructional works. On the New Zealand railways a signal and electrical engineer is responsible for the telegraphs and telephones, electric power and lighting, as well as the signalling.

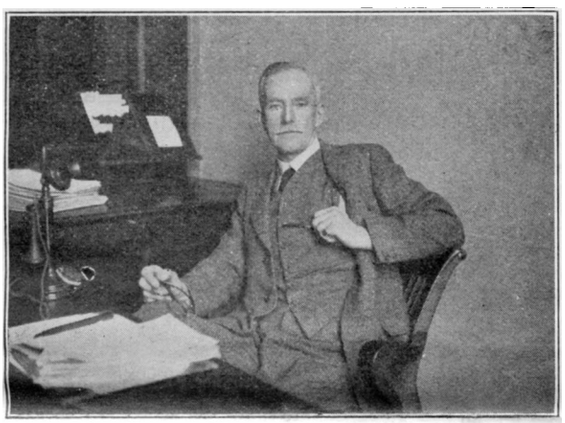
It is gret harm and certes gret pitee
To sette an irous* man in high degree.—*Chaucer.*

*Bad-tempered. J. J. T.

RETIREMENT OF MR. T. A. PROUT.

WITH the retirement of Mr. Prout at the end of last year the Post Office loses the services of another telephone pioneer. A short biographical sketch of his career appeared in the *Journal* as recently as last April, and it is sufficient now to record that he entered the service of the United Company in 1881, was with the Western Counties & South Wales Telephone Co. until its acquisition by the National Co. in 1892, after which he was successively District Manager at Bristol, Leeds and Manchester, and Assistant Superintendent of the North-Western Province. On the transfer of the Company's system to the Post Office, he came to Headquarters as Inspector of Telephone and Telegraph Traffic.

The large crowd which gathered in the deputation room on Dec. 13, when Mr. Dalzell, the Director-General of Telegraphs and Telephones, made a presentation to him on behalf of the staff, was an eloquent testimony to the popularity and esteem which Mr. Prout



MR. T. A. PROUT.

enjoys. Amongst those present were the Second Secretary, Mr. Raven; the Accountant-General, Sir Henry Bunbury; Mr. Bell, Mr. Leech and Mr. Wakeley, Assistant Secretaries; Mr. Valentine, Controller of the London Telephone Service; Mr. Grant, Mr. Weston, Mr. Townshend, Major Sambrook, Mr. Waters, Mr. Scholes, Mr. Hawker, Mr. Napier, Mr. Edmonds, Mr. Trayfoot and numerous other colleagues and friends.

Mr. Dalzell, in making the presentation, which took the form of a bankers' draft in favour of Messrs. Hampton, referred in happy terms to Mr. Prout's long association with the telephone service, to his pioneer work in the West of England, to his successive promotions (to which we have already alluded), to his sporting activities at lawn tennis, golf and football (he was one of the original members of the famous Bristol club), and amid cheers of cordial agreement, to his unfailing kindness and helpfulness to all who came to him for aid.

Mr. Prout, in reply, thanked the large company of his colleagues for tearing themselves away from the registered paper eases to which they were so closely attached in order to bid him so kind a farewell. And now, after having been the recipient of several white elephants in days of yore, such as huge tea urns with cubical capacities of colossal proportions exceeding his own powers of consumption of this beverage, Mr. Dalzell had just handed him a "draft." But Mrs. Prout who was present at his side had often warned him to avoid "draughts" to say nothing of "overdrafts." This particular draft, however, would make it possible for his wife to secure the magic carpet of her dreams and by closing her eyes and wishing further to see an easy chair descend upon it out of the ether.

Mr. Prout said he could say in Tennyson's alleged most atrocious verse :—

"I have a little room
None so bright,
Wherein to read
Wherein to write."

This room would assume new glories by this great kindness on the part of over a hundred of his friends at the G.P.O. on this day Dec. 13. His provincial friends had actually forestalled those at Headquarters by dissembling their love last Friday! The sinister associations of Friday and 13 were dissipated by his calculation that based on those days his income had been increased at the rate of £5,000 a year! The proper emphasis should be on "at the rate of" rather than on the £5,000. While he would prefer not to linger on the problem of How to live on 24 hours a day and half-pay and that doled out quarterly, he still had a strong fellow feeling with the great company of turkeys which, at this season, were being regally fed and pampered, but where will the turkeys and himself be in January 1927. Echo answered "Where?" Seriously, however, "friends are the flowers in life's garden," and he intended to cultivate those who had taken root in his life for so long as life was spared to do so.

If there was anything to complain of in the life here it was an absence of thrills. Apart from the Saturday morning when the Germans bombed us so that with our backs to the lower corridor walls we thought with each reverberation our upper floors had gone west, one's experiences in such a sea of courtesy and kindness were on the placid side. This was far from being the case of the telephone pioneers in the early eighties. Those were hard-up exciting days. No A.G.D. to pay your salary into the bank with Income tax painlessly subtracted. On Wednesday it was often difficult to see the cash for Saturday's pay roll in the offing. One week-end the skies were blacker than usual with the Company operating in the West and South-West of England and South Wales. Unless more capital could be secured and that mighty quick the fascinating business would be punctuated with a full stop. On arriving at the Bristol Office on the Monday morning the indefatigable General Manager's first anxious question was "Any applications in to-day Prout?" The reply was "None, Sir, but there is a man who has lots of money if only he would let us mind some of it for him." "Who is he and where is he to be seen?" His name is Mr. B— and he lives at P— where the railway ends." "Get me a Bradshaw and pick me out a night train." Away the brave man went with so slender a clue, and puffing the biggest cigar procurable in those days. The financier was found, the romantic new instrument explained and eulogised, he was invited to test it as the "Emperor of Brazil" had done in America a few years earlier when he exclaimed "my God it talks." In the "Delectable Duchy" in the eighties, what was not done to-day could be done to-morrow and if not done this week it could be done in the next, but the farseeing financier saw truly the potentialities of the invention and agreed to invest many thousands of pounds in the concern, and we all lived happily ever afterwards. The ship was salved once more. The Captain was given £100 by the Directors and the boy an increase of salary.

The never ceasing hunt for bold infringers of Bell's and Edison's precious patents afforded thrills and dangers galore for years on end. The thrill of talking from Teignmouth to London on a Sunday in the eighties over a single iron telegraph wire lent for the purpose by the Great Western Railway, was of the same order as that felt on a Sunday in 1926 in speaking for the first time from London to New York largely without wires.

Putting on one side the past, the most frequent question now was "Well, Father Prout, how are you going to spend your time without your blessed telephones?"

Ignoring for the moment the possible problem there may be in "How to live hilariously on 24 hours a day on half-pay and that in quarterly doles," the prospect was alluring. Fond as he was of agriculture he was not conscious of having yet sown his wild oats. Devoted to cricket and football he had yet to pay his first visits to Lords, The Oval, Twickenham and Richmond. Then there was golf which, regarded either as a disease or a career, certainly could involve a full time occupation. Smoking seemed a possibility. It was 50 years ago since he had smoked his first cigar. On the strength of to-day's draft he had just purchased a small box containing no less than 48 matches which, if draughts are avoided might suffice to ignite the 10 cigarettes just purchased from a Nottingham firm named Player. What too, of drawing, painting and photography. And as for reading, after 50 years practice, there were the works of Stevenson, Dickens, and Scott crying aloud from the bookshelves to be read and enjoyed. There were those Treasure Islands to be visited, great expeditions and romances of the first water looming ahead. Every Wednesday there will be the P.O. Circular and *Punch*. "Who could be dull?" To fill up interstices of time he had first joined a new Bowling Club. And if multitudious occupations failed what was wrong with leisure, was not that worth struggling to achieve.

W. H. Davies, the poet, was probably right.

"What is this life if full of care,
We have no time to stand and stare,
No time to see in broad daylight
Streams full of stars like skies at night,
A poor life this if full of care
We have no time to stand and stare."

Mr. Prout concluded by saying that he had experienced at the G.P.O. the truth embedded in some doggerel lines in a recent number of *Telephony*,

"An office can become in time
To man, and girl, and boy,
A certain kind of fellowship,
And work a certain joy."

OVERSEAS COMMUNICATION—ITS ORIGIN AND DEVELOPMENT.*

BY H. G. SELLARS.

ACCUSTOMED to the general and common use of the telegraph and telephone, the present generation is prone to forget the origin of these two means of communication and the difficulties which had to be overcome before their present standard of efficiency was attained. The ordinary citizen, to whom the transmission of messages by the medium of electricity is still somewhat mysterious; the engineer, who is continually striving to improve on the methods of his predecessors; and the operator, who carries out his, or her, daily task of manipulating the apparatus and makes excursions into the realms of theory with a view to obtaining technical certificates, are equally unmindful. Only on rare occasions do we throw our minds back over the past centuries, and endeavour to realise what the world was like before the ingenious apparatus, with which we are all familiar, became commonplace. The antiquarian, the curious, the amateur, and the expert will, therefore, not consider the time wasted if an attempt is made to examine, briefly, some of the data which will indicate the hopes, expectations and realisations of those who have contributed to the establishment of the world-wide system of communication which we enjoy to-day. It may be postulated without fear of contradiction, that the need for communication has existed as long as man has inhabited this globe. The desire to keep in touch with those setting out on a journey must have always been present, even if the imagination were not sufficiently developed to render the wish articulate.

The women of the Palaeolithic, Neolithic, Bronze and Iron Ages, watching their men leaving to face unknown perils; the dependents of those whose valiant deeds are told in Homeric epics; wives bidding farewell to the Greeks and Romans who left their countries on foot or by galley to conquer new worlds; spouses of Crusaders leaving for the Holy Land; the loved ones of all who have had to leave their homes, prior to the 18th century, would have been spared much of the anguish of parting, and the constant anxiety which prevailed until the travellers returned, if the facilities of which we now speak so glibly had been available. The necessity for communication has its roots deep down in the sentiments and psychology of mankind, and there is no doubt that attempts have been made from the earliest times to find means to satisfy the innate craving for news of distant friends, for the mental support which the reception of tidings brings, or for the furtherance of plans which may be necessary for mutual well-being.

EARLIEST METHODS OF COMMUNICATION.

To meet the multitudinous desires of human intercourse many ideas have presented themselves and innumerable methods have been tried. Fires and lights were, no doubt, used quite early in Man's career to convey information of various kinds. Beacons were lit on hilltops, or torches were waved to carry messages of goodwill or warning. In the shadowy records of Babylonia we read the charming story of the god Bel causing a rainbow to appear in the sky as a pledge to Khasisadra (or Xisuthros) that the deluge, which his ark had just survived, would not occur again. At a later period we are told, in early Jewish history, of the pillar of fire and the pillar of cloud, which served to direct the movements of the Israelites proceeding from Egypt to Canaan, and to indicate Divine presence. In connexion with our own country the story of the transmission of the news by beacon fire of the arrival of the Spanish Armada in 1588 springs readily to the minds of all of us. These cases, widely separated in time, and differing in circumstance, are excellent illustrations of the visual means of conveying information to a great distance, and over a wide area.

There is no doubt that on innumerable occasions, in the dim past, fire and light, used in various ways, have proved to be efficient news carriers and, as we know, lamps, rockets, and searchlights, are still extremely serviceable.

Another visual means of communication was that of flags, which, after being utilised in the British Navy since the thirteenth century, was systematised about 1665, when Sir William Penn (1621-70) drew up a code of signals. This was used until the end of the war with America, when M'Arthur improved upon it by including several flags in the same hoist. About the same time Lord Richard Howe (1726-99) devised a similar arrangement and the advantages of each were combined, twelve flags being brought into operation. In 1805 Admiral Sir Home Riggs Popham (1762-1820) introduced the system which formed the foundation of the present international code, consisting of 26 flags and pennants, of various colours and patterns.

Sound also has been pressed into the service of mankind. Turning again to Jewish history we find that Moses received Divine instructions to make two trumpets to be used for calling the people together for peaceful, religious, or martial purposes. Trumpets, or bugles, fashioned from the horns of animals, drums of crude or elaborate manufacture, and metallic instruments have all been used as occasion demanded and ingenuity prompted.

Bells, of course, have been used from the earliest times to disseminate information, e.g., Lucian, born about A.D. 125, mentions the marking of time by means of a bell. In A.D. 400 Paulinus, Bishop of Nola, introduced them into Christian churches, and in A.D. 1068 the ringing of the curfew bell at 8 p.m. informed all Englishmen that fires and lights must be extinguished. In A.D. 1282 the vesper bell was the signal for the butchery of eight thousand Frenchmen, and, in 1572, the massacre of St. Bartholomew was started by the ringing of the bells of St. Germain l'Auxerrois. As a set-off against the murderous use of bells demonstrated by these two events, one might refer to the humane practice of placing bells on rocks and buoys, and the consequent saving of thousands of lives by the conveyance of their warning notes.

The invention of gunpowder by Schwarz in 1320, and the introduction of small-arms in 1471, rendered it possible to convey signals to greater distances than had been practicable previously, and, about the year 1780, the British Rear-Admiral Kempenfeldt (1718-82) introduced a system of communication by guns which was improved and adopted in 1785 by Lord Richard Howe, First Lord of the Admiralty.

Whistling with the mouth has for centuries been the means of communication between the natives hunting in the Andes, and, as we are all aware, sirens are used on modern vessels and locomotives to give certain information.

Leaving the question of utilising sound for the purpose of communication, we must revert to visual signals, because, prior to the introduction of the electric telegraph, sight reading was the method of which the Government and the public made the greatest use. The British naval authorities, always interested in signalling, placed on the roof of the Admiralty towards the end of the eighteenth century the shuttle telegraph, which had been invented by Richard Lovell Edgeworth (1744-1817) and, by relaying the signals, kept in touch with the Dockyard at Portsmouth. In 1794 a Frenchman named Chappé introduced the semaphore, and in 1795 it was adopted by the British Government. Three pairs of movable arms were used originally, but this number was reduced to two and finally (in 1847) to one. James Henry Leigh Hunt (1784-1859) writing in 1835, and referring to the Admiralty telegraph, said, "Where the poor Archbishop sank down in horror at the sight of King Charles's execution, telegraphs now ply their dumb and far-seen discourses, like spirits in the guise of mechanism, and tell news of the spread of liberty and knowledge all over the world."

The success of the Admiralty optical signalling station led certain enterprising individuals to provide public facilities, notably a London merchant named Watson, who erected a station at the top of a shot tower near London Bridge for the purpose of communicating with Deal. This station had a very short life, being burned down in 1843. Semaphores, of course, could only be used advantageously when visibility was good, and their supersession was a very welcome event.

ELECTRICAL DISCOVERIES.

While ingenious minds had been employed in devising mechanical methods of communication, others had been fired with the idea of utilising the powers of electricity to attain a similar result, and when the Admiralty semaphore was dismantled in 1851 it was possible to connect that office with Portsmouth by means of nine lines of electric telegraph. Let us follow the laborious steps of the inventors whose experiments made such a result possible.

In one respect, at least, electricity occupies an unique position—it was not used by the Chinese two or three thousand years ago. It is claimed, however, that their Emperor Hoangti constructed a mariners' compass about the year 2634 B.C., a declaration which implies that he had unwittingly detected the earth's magnetic force and thereby anticipated the discovery of the lodestone by Roger Bacon in 1267, and the compass introduced by Flavio Gioja in 1302. Thales, father of Greek philosophy, is said to have known the electrical properties of rubbed amber in 600 B.C., but no progress appears to have been made in this branch of science until Roger Bacon (1214-1294) published his discoveries, which led to an accusation of dealing in magic, and to his banishment from England. In 1600 Dr. William Gilbert (1540-1603) gave the world his theories on magnetism and electricity, and is said to have invented the terms "electric force" and "electricity." His name has since been adopted to indicate the unit of magneto-motive force. About 1650 Otto von Guericke (1602-86), of Magdeburg, invented an electric machine and conducted experiments in electro-statics. The electrical condenser known as the Leyden jar was discovered by Musschenbroeck in 1745, and this led Benjamin Franklin (1706-90) to investigate electricity and its place in nature. Aug. 5, 1747, is an important date in the history of telegraphy, for on that day Dr. Watson proved that electric current could be transmitted through a wire using the earth for the completion of the circuit. It soon became evident that research should be carried out on co-ordinated lines, and in 1767 Dr. Priestley suggested the formation of an Electrical Society, but it was not until 1837 that the London Electrical Society came into being, with William Sturgeon (1783-1850) and Gassiot as the President and Treasurer, respectively. In his inaugural address, Sturgeon said that the preceding forty years had been more productive of electrical discovery than all the antecedent centuries. This conclusion was undoubtedly correct, as will be seen by a brief recital of the names of those who laid the foundations of the science which was to become so beneficial to man. Henry Cavendish (1731-1810) carried on research work about the year 1775, while Charles Augustin de Coulomb (1736-1806) invented the torsion balance for measuring electrical attraction in 1779. In 1789 Luigi Galvani (1737-98) made various electrical experiments and in 1800 his fellow-countryman, Count Alessandro Volta (1745-1827), introduced the electric battery. André Marie Ampére (1775-1836) demonstrated the relation between magnetism and electricity in 1820 but it was not until 1825 that William Sturgeon produced an electro-magnet. In 1831 Michael Faraday (1791-1867) published his discovery of magneto electric induction. Useful work was done by Karl Friedrich Gauss

* Paper read before the Post Office Telephone and Telegraph Society of London.

(1777-1855) who, in conjunction with Wilhelm Eduard Weber (1804-91) erected a magnetic observatory at Göttingen and formed a Magnetic Association, while Eduard Friedrich Weber (1806-71), brother of the latter, devoted himself to magnetism and electro-dynamics. Women have been conspicuous by their absence from electrical research work, but it must be mentioned that about this time, viz., in 1834, Mrs. Mary Somerville (1780-1872) published her work on "The Connection of Physical Sciences." In 1834 Sir Charles Wheatstone (1802-75) determined experimentally the velocity of electricity, and in 1843 introduced instruments for measuring the constants of a voltaic series. He did not actually invent the apparatus known as the Wheatstone Bridge, but was instrumental in bringing it to public notice. In 1845 Sir William Thomson (afterwards Lord Kelvin) published his work on the laws of electro-statics and gave his attention to electro-dynamics. Sir Charles Tilston Bright (1832-98) in 1852 patented a new system of winding coils for obtaining a greater determination of polarity, while James Prescott Joule (1818-89) dealt with the magnetisability of iron, and the quantity of heat due to the passage of a current. Georg Simon Ohm (1787-1854) established the fact that the strength of the current in a circuit varies directly as the electro-motive force and inversely as the resistance, and his fellow-countryman, Gustav Robert Kirchhoff proved that current divides between circuits in parallel, in direct proportion to their respective conductances. Time will not permit a fuller reference to the work of the foregoing scientists, or the mention of many others who followed in their footsteps. In 1861, as the sequel to a letter written to Professor J. Clark Maxwell some months previously, Sir Charles Tilston Bright and his partner, Latimer Clark, pointed out to the British Association the desirability of establishing a set of standards of electrical measurements and, following the discussion, a committee was formed to determine a rational system of electrical units, and to construct an equivalent standard measurement. The members were Professor Williamson, Sir Charles Wheatstone, Sir William Thomson, Miller, Clark Maxwell, Dr. Matthiesen, Fleming Jenkin, Sir Charles Bright, Dr. J. P. Joule, Dr. Esselbank, Balfour Stewart, C. W. Siemens, G. C. Foster, D. Forbes, C. F. Varley, Latimer Clark and Charles Hockin. The work of the committee was finished at the end of 1869 and, as a result of its labours, we have a system of electro-magnetic units—an arrangement which was confirmed by the International Congresses held in 1881 and 1908. The names of great pioneers have been identified with the nomenclature of these electrical units and standards. We have Gilbert, the unit of magneto-motive force; Oersted, the unit of reluctance or magneto resistance; Coulomb, the unit of quantity; Volt, the unit of electro-motive force; Ampére, the unit of electric current; Farad, the unit of electrical capacity; Gauss, the unit of magnetic intensity; Joule, the unit of electrical work; Ohm, the unit of electrical resistance; Mho, the unit of conductivity; Maxwell, the unit of magnetic flux; Henry, the unit of inductance; and Watt, the unit of rate of work. To these must be added Galvani, who gave his name to Galvanism, and Lenz and Kirchhoff, whose "laws" are continually being quoted. Members of the Telephone and Telegraph Society of London will agree that no better method could be devised for honouring and perpetuating the memory of some of our greatest electrical authorities than that of embodying their names in the terms which are in everyday use by electricians throughout the world.

PRODUCTION OF ELECTRICAL POWER.

The theories of electricity having been established, it was necessary to produce the power, and scientists of all nations worked hard in that direction. Otto von Guericke in 1650, Volta in 1775, and Pacinotti in 1860 produced electrical machines, their efforts being emulated by Holtz, Bertsch, Carré, Voss, Wimshurst, &c. Galvani, Volta, Clamond, Planté, Leclanché and others studied the means of producing electricity by batteries and other methods. John Frederic Daniell (1790-1845) invented the battery known by his name and Latimer Clark introduced a standard cell composed of platinum, zinc and mercury. The storage of electricity occupied attention and in 1860 Gaston Planté invented the first lead cell, which was the forerunner of our secondary cells. Metzger in 1878, Faure in 1880, Gladstone, Hart, Tribe and Bright contributed the results of their ingenuity. Much literature has appeared on this subject and some of the most useful has been produced by practical men well known to this Society, e.g., T. F. Purves, W. Perren Maycock, J. G. Lucas, W. R. Cooper, A. Fraser, H. H. Harrison, &c.

The Leyden Jar demonstrated the value of condensers, and Franklin, Fizeau, and many others, laboured to produce apparatus of suitable form. In 1900 G. F. Mansbridge patented an ideal condenser, in which tinfoil paper took the place of metallic foil and paper.

TESTING APPARATUS.

Testing of batteries, lines and apparatus was, of course, found to be necessary. In 1849 Sir Charles Bright devised a system for locating line faults from a distant point, while Varley, Pomeroy and Eden suggested other means. Lord Kelvin, who solved the mathematical problem of the propagation of currents in telegraph cables, invented a method of measuring the resistance of a battery. Rayleigh and Crompton found means of measuring electro-motive force, Preece calculated the current necessary to fuse wire, and Glover worked out the resistance of various metals. Dr. Muirhead, Fleming, Kempe, Poggendorf, Mance and Maycock have dealt with various phases of the subject. Mention must be made of a very useful piece of apparatus used when testing, viz., the galvanometer, an instrument in which an indicator needle is deflected in response to the current passing through the adjacent coil or coils. Reference will be made later to the discovery of this phenomenon. Galvanometers were produced by Schweigger, Spagnoletti, Melloni, Wiedemann, Helmholtz, and others, but the most ingenious was the reflecting galvanometer invented by Lord Kelvin and based on an instrument utilised by Gauss and Weber at Göttingen in 1833. It consists of a coil of wire in the centre of which is a copper tube from which is suspended a small mirror, upon the back of which are fastened two or three pieces of nagnetised steel. A beam of light is directed by a lens on to the mirror, the reflection from which moves along a scale in accordance with the movements of the mirror caused by the current in the coil. The copper tube was intended to retard the oscillations of the mirror. D'Arsonval, Ayrton Mather and Crompton galvanometers are variations of Lord Kelvin's instrument.

PROVISION AND MAINTENANCE OF LINES.

Before dealing with the many types of signalling apparatus which have been utilised we might usefully direct our attention to the question of wires. The provision of overhead lines presented little difficulty, insulators of various kinds, particularly the double-shed insulators of Bright and Cordeaux, rendering insulation fairly easy. Underground wires, however, opened up a difficult problem which was tackled as early as 1795 by Don Francisco Salva, who suggested to the Barcelona Academy of Sciences that wires could be covered with pitch-coated paper and laid underground, or under water. In 1843 Dr. Montgomerie, of the Indian Medical Service, had submitted samples of gutta-percha to the Society of Arts and, in 1847, Faraday suggested its use as an insulating medium. The idea was adopted by Dr. Ernst Werner von Siemens (1816-92) who constructed the first telegraph line in Germany. In 1851 and 1852 underground cables were laid from Dover to London and thence to Birmingham. In spite of the protection afforded by troughs and tarred yarn, however, the gutta-percha became desiccated and the lines were placed on posts. Since that date insulating media of various kinds have been brought into use, and perfection may be said to have been reached. It may be interesting to mention here that the longest span of overhead wire used for telegraphic purposes is nearly 1¼ miles in length and spans the River Kistnah (India) at a height of 1,200 ft., while the longest submarine cable is that running from Vancouver to Fanning Island which is 3,458 nautical miles in length.

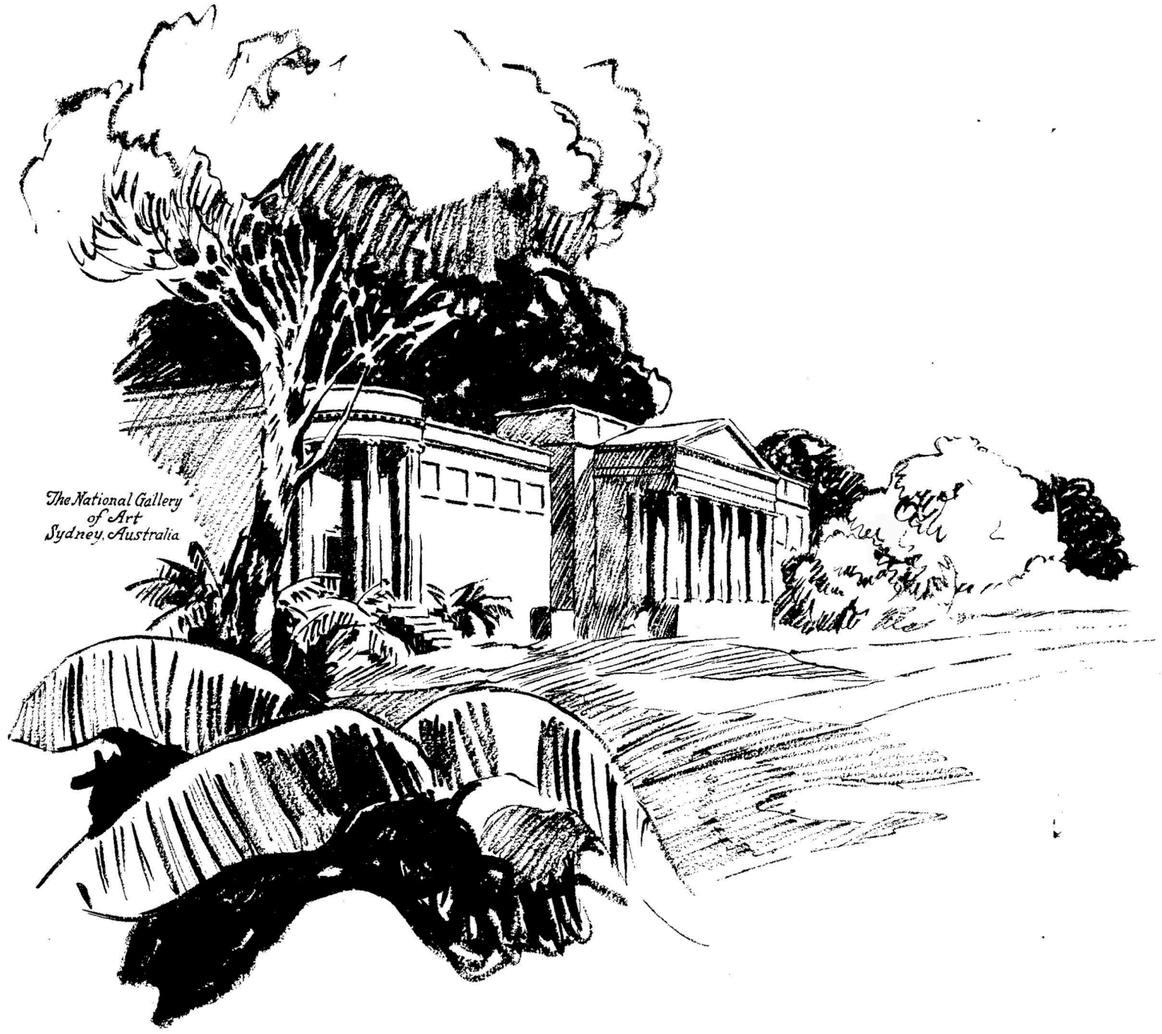
At an early stage in electrical telegraphy it was found that induction took place in wires running along the same route, and, in 1879, Professor David Hughes (1831-1900) suggested to the Society of Telegraph Engineers and Electricians that this could be obviated by twisting the wires. M. Brasseur, of Belgium, supported this idea in 1881 and the system has been extensively adopted.

ELECTRICAL SIGNALLING APPARATUS.

The great electrical discoveries of the early eighteenth century led to numerous devices for telegraphing electrically being proposed by experimentalists domiciled in all parts of the world. Inventions followed each other with astonishing rapidity.

In 1753, Charles Morrison, writing in the *Scots Magazine*, suggested an insulated wire for each letter of the alphabet the words to be spelled by passing a current, or charge, along the appropriate wire. This system was tried and worked to a small extent by Lesarges at Geneva in 1774, but its slowness, and the number of wires involved, rendered it impracticable. In 1787, 1790, 1809, 1810 and 1816 ingenious but cumbersome methods of communication were tried by Betancourt, Chappé, Soemmering, Schilling and Sir Francis Ronald, respectively. In 1819, however, existing ideas were revolutionised by the Danish professor, Hans Christian Oersted (1777-1851) who ascertained that a needle could be deflected by the current passing through an adjacent coil or conductor. Following this idea, Ampere, in 1821, prompted by Laplace, suggested that a telegraph apparatus might be constructed composed of needles which, deflected in certain directions, would indicate different letters of the alphabet. At Heidelberg, in March, 1836, Sir William Fothergill Cooke (1806-79) saw a pair of needles fitted up in a manner similar to that proposed by Laplace and Ampere, and, at a later date, showed Michael Faraday an apparatus which he had constructed for the directors of the Liverpool and Manchester Railway. He met Sir Charles Wheatstone (1802-75) subsequently and, in June, 1837, joined him in patenting an instrument with five vertical needles on horizontal axes which necessitated the use of five wires. To carry out experiments lines were laid between Euston and Camden Town and, on the evening of July 25, 1837, Wheatstone and Cooke, accompanied by Brunel and Stephenson, demonstrated the practicability of the electric telegraph. Afterwards a two-needle apparatus was used and finally in 1845 it was found possible to use only one needle. This was controlled in a manner already suggested by Schilling, viz., by reversing the direction of the current in the adjacent coils, of which there were several patterns, e.g., those of Neale, Spagnoletti, and Varley. In 1832 Samuel Finley Breese Morse (1791-1872), while returning to America, had conceived the idea of recording telegraph signals, and before he left the ship the telegraphic system of dots and dashes known by his name was practically complete. This code was used on the single-needle instrument, beats to the left and right representing dots and dashes respectively. Used on the railway at first, the utility of the telegraph soon rendered it necessary to give facilities to the public, and, in 1845, the first line of Cooke and Wheatstone's telegraph was opened between London and Southampton. In the same year a game of chess was played by telegraph between London and Gosport, and the first newspaper report sent by telegraph appeared in the London *Morning Chronicle*. In 1854 the single-needle system was displaced to some extent by the bell sounder introduced by Sir Charles Tilston Bright (1832-98) which produced two sharp different sounds representing dots and dashes to the receiving operator. Professor Morse, in his report on the French International Exhibition of 1867, referred to Bright's Bell Sounder as the "fastest manual telegraph." This can be readily understood when it is remembered that the operator reads by two distinct sounds and the dashes are of the same length as the dots.

(To be continued.)



The National Gallery of Art Sydney, Australia

Beyond the Horizon.

OVER the farthest edge of the world lies one of the world's great Commonwealths. Founded in 1788 as a far outpost of the British Empire, Australia, through the progressive spirit and energy of the pioneers who settled there, has become one of the most prosperous of countries.

The realization that without adequate and up-to-date telephone systems no country can continue to thrive, early prompted the engineers of the Australian Post Office to adopt Strowger Automatic equipment as a standard for telephone service in its more important cities.

The conversion of Sydney's telephone system to Strowger Automatic, begun in 1914, has now progressed until to-day the greater part of that city is enjoying Strowger Automatic service. Melbourne, Perth, Brisbane and many other cities of the Commonwealth are finding in Strowger Automatic equipment a permanent and satisfactory solution to their telephone problems.

Automatic Electric Inc.

FACTORY AND GENERAL OFFICES: 1033 W. VAN BUREN ST.
CHICAGO, U.S.A.

The
Telegraph and Telephone Journal.

PUBLISHED MONTHLY IN THE INTERESTS OF THE TELEGRAPH AND TELEPHONE SERVICE, UNDER THE PATRONAGE OF THE POSTMASTER-GENERAL.

Editing and Organising Committee - - - J. STUART JONES. JOHN LEE. J. J. TYRRELL. W. A. VALENTINE. J. W. WISSENDEN.

Managing Editor - - - W. H. GUNSTON.

NOTICES.

As the object of the JOURNAL *is the interchange of information on all subjects affecting the Telegraph and Telephone Service, the Managing Editor will be glad to consider contributions, and all communications together with photographs, diagrams, or other illustrations, should be addressed to him at the G.P.O. North, London, E.C.*1. *The Managing Editor will not be responsible for any manuscripts which he finds himself unable to use, but he will take the utmost care to return such manuscripts as promptly as possible. Photographs illustrating accepted articles will be returned if desired.*

VOL. XIII. JANUARY, 1927. No. 142.

ANOTHER YEAR'S PROGRESS.

THE year 1926 has seen a remarkable increase in the number of telephones in Great Britain. The million and a half mark has just been passed, whilst in the London area alone the half-million was reached in July last. The full returns for December are not to hand at the time of writing but the total number of telephones in the country at the end of last year may safely be put at 1,507,000, an increase of 148,000—the largest yet recorded—on the figure for 1925. This represents a percentage increase of 10.8, and brings the proportion of population to telephones down to 29. The number of new exchanges opened during the year was upwards of 170.

The telephone year has been signalised by the laying of a third Anglo-Dutch cable containing 12 additional circuits, and of a new Anglo-Belgian cable containing 21. During the year, too, public telephone communication was established with Germany, at first with Berlin and Hamburg only, then gradually extended to all parts of the Reich. Most interesting of all, perhaps, of the year's news is the fact that successful speech-trials were made by wireless between London and New York, resulting in the recent announcement that a public service will be offered early in the New Year.

The story of the telegraph service during the past year is like the curate's egg. In one respect it has been a notable year for it saw the debut of Beam Wireless, the latest manifestation of Senatore Marconi's genius. The very efficient service which has been established by this means between this country and Canada is to be followed soon by similar means of communication with the other Dominions, and we may hope that this Empiradio service will add not only to the credit of the British Post Office—which, though important enough to us, is a comparatively small thing in the greater issues—but to the cohesion and welfare of the Empire. It is worth mentioning in this place that the number of Imperial Christmas Greetings transmitted by the Imperial Cables and the Beam Wireless have practically doubled in comparison with last year.

The past year has not witnessed the removal of the blight which has for so long lain on the traffic of the inland telegraph service, but such a year, with its industrial troubles of unprecedented magnitude, gave the inland service no opportunity to raise its head. The new year opens with the prospect of greater industrial stability and activity and we hope that, at its finish, it will have proved to be a prosperous one in all respects.

"PIRATES."

THIS article does not profess to deal with the delights of "Treasure Island" or the hidden gold and jewels of the Caribbean Seas. Still less with the transmogrified cellars of the great west-end stores, the bazaars established during the Christmas season for the great and noble purpose of extracting the shy and crumpled Treasury note from the reluctant hands of young and old alike. Some of those past the rosy glow of youth may think and even say that the Christmas season is one sustained unlicensed orgy of piracy; but we won't waste our time and sympathy on such debased souls.

What really gave occasion to this note is the Press statement that a great wave of crime has now spread like a plague over our law-abiding fellow citizens. The law says you may not use wireless receiving apparatus without a licence, and we know from the frequent records of prosecutions that there are some folk who regard the law generally as a "hass" and this law in particular as not applying to them. They call such folk "pirates" because, forsooth, they take without paying and often as "oscillators" spoil what they do not consume. But the percentage of "pirates" to "honest citizens" cannot surely be so high as the Press claims. We have seen the number given as anything between half a million and seven millions. Just think what that means! There are something over two million licensees and we are told that at least 20% as a minimum and 80% as a maximum of the total number of listeners are "pirates." Frankly, we do not believe it; even in these days of cat burglars and motor getaways, it is too much to swallow, and we are reminded of Grimm's fairy tales and the black expectoration which ultimately became a flock of crows. Rumour is always a lying jade.

Announcing

The Formation of a New Corporation

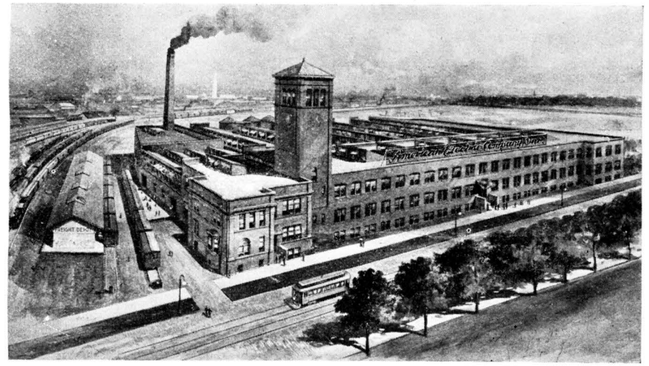
AMERICAN ELECTRIC COMPANY, INC.

Having Extensive Facilities for Manufacturing and Marketing All Lines of Manual Telephone Equipment, Telephone and Electrical Supplies and Radio Specialities Formerly Handled by the Monarch Telephone Manufacturing Company and the American Electric Company.

American Electric Company, Inc., a new Corporation with general offices and factory at State and 64th Streets, Chicago, has taken over the complete lines of manual telephone equipment, and telephone and electrical supplies formerly manufactured and sold by the Monarch Telephone Manufacturing Co. of Chicago. The new Corporation has, in addition, purchased the assets, goodwill and business of the former American Electric Company and will carry on the manufacture and marketing of its entire line of telephone, radio and associated products.

The new Company's engineering and production facilities, already extensive, will be enlarged to meet the needs of a growing business, and with its comprehensive lines of manual telephone apparatus, telephone supply material and radio products, the Company is in a position to meet the needs of the telephone field with an unusual degree of promptness and efficiency. Customers of the former American Electric Company and of the former Monarch Telephone Manufacturing Co., in addition to being able to secure equipment formerly manufactured by these Companies, will enjoy the advantages that come with better production facilities and enlarged resources.

The export departments of the two former Companies have always formed important sections of their businesses and under the new arrangement the requirements of foreign telephone administrations and operating companies will be met with increased efficiency and expedition.



This extensive manufacturing plant, located at State and 64th Streets, Chicago, and formerly owned by the American Electric Company, has been taken over by the new corporation, and will be expanded to take care of increased production.

The manufacturing facilities thus provided for the products of American Electric Company, Inc., are augmented by excellent facilities for prompt shipments, including extensive warehouses, private switchtrack and close proximity to all important freight depots.

The Officers and Directors of American Electric Company, Inc., are as follows:

P. C. BURNS, Chairman of the Board

H. L. Harris - - -	President	L. Q. Trumbull -	Sec. and Treas.
W. F. Benoist -	First Vice-President	Edward Tubbs - - -	Auditor
H. D. Currier	Vice-Pres. & Chief Engr.	R. G. Faulhaber-	Sales Manager

"FOR GREATER SERVICE TO TELEPHONE USERS."

American Electric Company, Inc.

State and 64th Streets,
Chicago, U.S.A.

TRANSATLANTIC TELEPHONY.

THE Postmaster-General announced on Dec. 28 last, that in view of the satisfactory progress being made in the experimental development of Transatlantic telephony, it was hoped to open a preliminary public service with the New York telephone area early in the present month.

Calls will be accepted for a *particular person*, if so desired, in which case the name of the person required *as well as* his usual telephone number and the name associated with this number in the Telephone Directory should be given. If the person asked for is not obtainable, either at his own telephone station or at some other telephone station in the New York area, the calling subscriber will be asked whether he wishes to speak to another person at the telephone station designated. Details as to method of booking calls will be announced later.

The charge will be £15 for a conversation of three minutes and each additional minute above the first three will be charged at £5. In the present stage of technical knowledge, there will be occasions, more particularly in the late afternoon, when atmospheric conditions will prevent effective conversation; and allowance will be made in charging for individual calls when the conditions have been difficult.

In the case of a "particular person" call, the normal charge will not be levied unless effective conversation is actually offered between the calling subscriber and either the particular person asked for or a substitute accepted by the caller. When communication with the number required is established, but neither the particular person required nor an accepted substitute is obtainable, a Report Charge of £2 will be made in place of the normal charge. When communication with the number is not established no charge will be made.

The period allowed on any individual call will be limited to 12 minutes when there are other callers waiting to use the service. Time in excess of 3 minutes will be charged at the rate of £5 per minute.

It is hoped to issue a further notice in the first week of January.

PHANTASY AND FACT.

THE sweeping criticisms of telephone affairs which are made by those who have only the vaguest and most precarious grasp of any relevant facts or figures are often truly astounding. A writer in a well-known London evening paper recently said: "I see that the Postmaster-General announces with something of a flourish that there are now over 515,000 telephones in the London area. But, as there must be a dozen of second-rate cities in America with more than that, the figure only serves to show the leeway we have still to make up."

In the light of cold fact, the dozen second-rate cities in America dwindle down to two, viz., New York and Chicago. We hope that those flourishing villages will like the adjective with which our light-hearted critic has honoured them. These two cities, it may be added, are the only ones, not only in America but in the world, which have more telephones than London.

HIC ET UBIQUE.

BY a printer's error in Mr. Archibald's "Notes on Telegraph Practice" in the December issue the third paragraph from the bottom (page 42, second column) reads "delivery by telephone was uneconomical." It should read "was economical only if a telegraph or telephone retransmission is saved," &c.

We quoted in our last issue a report of the Department of Overseas Trade in which it was stated that the number of telephones in Germany had increased at the end of January, 1926 by 11.2% compared with the year before. It is difficult to reconcile this figure with the official statistics at our disposal. We have not indeed, the figures as at Jan. 31, but the increase in telephone development in Germany during the year ending Dec. 31, 1925, was at the rate of rather more than 8%, and during the year 1924 at the rate of 6.5%.

A paragraph in *Telephony*, of Chicago, states that a report of the Japanese Government shows that there are approximately 400,000 telephones in that country. Official figures supplied to the British Post Office show that there were 573,144 in 1924. The official *Statistique Générale*, published at Berne, shows 544,540 for the same year, and the American Telephone & Telegraph Co.'s statistics for 1924 (based on official information) give 544,433 (excluding 23,800 temporarily out of service as the result of the earthquake). Truly, the way of the statistician is hard!

A development of significance for British manufacturing interests, according to *The Times*, is involved by the purchase of the control of the British Columbia Telephone Company, one of the most flourishing telephone concerns in Canada. In fact, British Columbia is telephonically the most highly developed Province in the Dominion. The buyers are a holding company (the Associated Telephone and Telegraph Company) which includes Theodore Gary & Co., the International Automatic Telephone Company, British Insulated Cables, Cables, Telephones & General Trust, and Siemens Brothers & Co. It is understood the British Columbia Telephone system is now going to be converted to an automatic system, and this must obviously lead to the International Automatic Telephone group having the important business of carrying through the conversion. For some time past determined attempts have been made to acquire control of telephone companies abroad for the purpose of transferring valuable manufacturing business pertaining thereto to factories on the continent of Europe and elsewhere, which owing to exchange conditions and cheap labour are able to quote competitive prices for supplies. The British Columbia Telephone acquisition is a direct answer to these attempts to cut into British export trade. By reason of the operation of Imperial preference it may be anticipated that all new apparatus and supplies will be furnished by Canadian and British manufacturers.

A Manchester paper says that Father Ronald Knox can recall telephoning from Manchester to London in order to find out whether the telephone, *then a new toy*, really worked. As a matter of fact, however, the telephone was long past the "new toy" stage before communication between London and Manchester was obtainable, which was not until 1890.

A correspondent of the *Times* says:—

"Including the rent for the telephone, the charge for 76 local calls by me during one quarter comes to £2 6*s*. 4*d*., that is to say, over 7*d*. per call, whereas I could have made calls at a public call office for 2*d*. each!"

The writer does not seem to realise that the difference between the two facilities is much the same as that between having a car of his own and employing an occasional taxi.

The Annual Prize Distribution and Students' Conversazione of the Northampton Polytechnic Institute was held on Dec. 3. Mr. W. H. Webbe, C.B.E., Chairman of the Education Committee of the London County Council, distributed the awards and gave an address.

The Conversazione was continued on the following Saturday, when the building was thrown open to the whole of the members and students and their friends.

We wish all our readers at home and abroad a Happy and Prosperous New Year.

J. J. TYRRELL—AN APPRECIATION.

IT is not for the present writer to attempt a biographical record of a member of the Editing Committee of this *Journal* who left us at the end of last year, nor yet to appraise his great services both to the Central Telegraph Office and to the *Journal*. But perhaps I might set down, for what they are worth, the impressions of one who had the honour and the good fortune to be brought into fairly close contact with him during the last twelve months of his official career.

The dominant impression is one of keenness and hopefulness. A novice entering the Post Office after the war might well suppose, from conversation with men of Tyrrell's age, that the Post Office passed through its Golden Age somewhere in the 'nineties, an age when men were absorbed in their work and indifferent to their pay; that a Silver Age lingered on until 1914 or thereabouts; but that in these decadent days the only thing left was to mourn the glories of the past and to try to prevent the spark that might still remain from dying out altogether. He would suppose that of all the sides of Post Office activity, telegraphy was in the worst case, condemned as it was by the most eminent physicians, if not to extinction, to a lingering but inevitable decline.

But Tyrrell was never among the pessimists. He had been a telegraphist, man and boy, for forty-four years, and fervently believed in telegraphy. His confidence in its future was no less than his reverence for its past. He believed that if you turned it out at the door, it came in again at the window; you closed down the inter-communication switch to Balham, only to establish a wireless circuit to Montreal.

His pride and belief in his job is probably the reason why, despite his natural conservatism, he adapted himself so well to the startling developments of international telegraphy after the war. In the last ten years of his official career he must have had little leisure. He helped to found the fine tradition of the Imperial Cable Service, combining the old spirit of conscientious and accurate operating with a new spirit of commercial enterprise and competitive keenness. He fostered the wireless organisation of the C.T.O. from its almost helpless infancy to its present sturdy manhood: and it was good to see, in the press-photograph at the inception of the Canadian Beam service, that Tyrrell was in the centre of the group.

So boundless was his experience and so retentive his memory that we in the Secretary's Office, whether on the cable or wireless side, found him almost indispensable. We shall have to try to get along without him, and we should be false to his memory if we unduly mourned his loss. For after all his enthusiasm was infectious, and many were infected. The tradition which he absorbed and diffused will continue, and telegraphy will find other servants, though none more loyal and faithful. We wish him a good time in his retirement, where he will have some leisure to expand those other interests which are no secret to the readers of this *Journal* and *St. Martin's*; we hope that his recollection of his colleagues may be as pleasant as theirs are of him, and that, despite his modesty, he may sometimes be cheered by a merited pride in the good work he has done, and the fine example he has left behind.

W. D. S.

NOTES ON TELEGRAPH PRACTICE.

By G. T. ARCHIBALD.

(*Continued from page* 43.)

XXIII.—*Concerning Phonogram and Telephone-Telegram Equipment.*

THE history of phonogram and telephone-telegram equipment lacks the glamour and romance of telegraph equipment and is soon told. It is nevertheless of considerable interest particularly in regard to the more recent development.

As has been shown, a 15 minutes quality of service is aimed at in the case of telegraph circuits; it is possible, therefore, to line up the traffic and to work any number of circuits justified on a transit time basis. The telegraphist is not brought into direct contact with the public except as regards the counter transaction, usually carried through without delay. The sender of a telegram so tendered knows that the message will reach its destination within a reasonable time, and he is not particularly interested in the process of transmission, &c.

The position is not quite similar where the acceptance of a phonogram is involved. Telephone subscribers are, naturally, impatient of delay in the acceptance of their demands and as telephonists cannot hold over even for brief periods calls which it is not possible to complete on demand it is necessary to provide phonogram circuits on a basis which will meet all reasonable requirements. Moreover, the Post Office urges telephone subscribers to rent sufficient lines to enable them to answer calls promptly, and it is, therefore, compelled to set an example in providing adequate circuit facilities for its own traffic. Accordingly it has been decided as a matter of policy that subscribers must not, except in very unusual circumstances, be told "Number Engaged" when they ask for "Telegrams."

The answer of a phonogram telephonist to a demand for "Telegrams" is equivalent to the answer of a called subscriber. The standard speed of answer has therefore been fixed at 10 seconds. Without this period of what may be called permissible delay the phonogram service would be so costly as to be impracticable.

The phonogram equipment enables incoming calls to be held over, if necessary, for short periods so that the load may be distributed evenly over the working positions. The possibility that a phonogram operator will be at liberty to take a call during the permissible waiting period increases with the number of working positions in use; put in another way the economy resulting from the use of switching apparatus increases with the size of the installation.

Under the old Post Office system subscribers' telegrams were dealt with at the switch section and this method is still used in a few unimportant instances. The earliest definite phonogram equipment was a small concentrator switchboard with jacks and indicators (magneto or lamp) to which was led the necessary exchange lines and phonogram positions. All calls received were for "Telegrams" and there was no necessity for the switch operator to speak. Then, as now, direct telephone-telegram lines were also led to the switchboard and all calls were dealt with as far as possible in the order of calling, preference being given to telephone subscribers.

The concentrator type of equipment was in general use until quite recently. It was fairly satisfactory, but the switching load even during the busy hour was not generally sufficient to provide a full load for the operator who was, as a rule, expected to deal with a few phonograms or simple non-operating work. This arrangement is open to the objection that the operator's attention is divided between two kinds of work and it has been found in practice that it results in a definite loss of time in connecting and disconnecting circuits. Moreover the operator is more liable to make mistakes in the reception and dictation if she attempts to carry out her switching duties whilst engaged in the disposal of a telegram.

In order to overcome the difficulties created by the use of a switchboard and switching operator the whole question was carefully considered, and in 1920 a new type of board was tried at certain small offices. This consisted of a small lamp signalling switchboard with three positions, each telephonist being required to operate her own calls. Each operator has 2 ft. 6 ins. of table space in which to work and the panel is placed in the centre position.

Limitations of reach prevent more than three telephonists from working at a single switchboard and the logical development, the trial having proved satisfactory, was a form of ancillary equipment whereby the concentrator is duplicated for every three positions. Each calling signal is thrown up simultaneously on each ancillary panel and every operator is in a position to answer every call. It is possible that two or more operators may endeavour to take up the same call, but such cases are infrequent and, as the equipment is so arranged that only one operator can secure connexion with the calling circuit, no difficulty is experienced.

Outgoing circuits are included in every panel and in order that telephone-telegram circuits may be called, each operating position is equipped with a ringing key.

Operating positions are provided with head set, key and plug cord; the insertion of the plug automatically extinguishes the calling signal on every multipled panel. In addition a holding circuit is fitted which enables the operator to ask any calling subscriber to wait for a moment. This type of apparatus has the positive advantage that it may be opened or closed position by position as the work demands and it is now the standard equipment for small and medium sized offices, i.e. offices requiring not more than 12 positions. The dimensions of the panel are $18\frac{1}{2} \times 6 \times 12\frac{1}{2}$ ins. There is, however, a tendency on the part of operators to sit close together with the result that there is greater liability to overhearing. This tendency can only be checked by careful supervision.

The most recent development of ancillary phonogram equipment is the continuous panel system designed for use at offices where

more than 12 positions are staffed during the peak period. The circuits are arranged over a continuous line of panels, each $8\frac{3}{4}$ inches in height by $9\frac{3}{4}$ inches in depth, along the operating tables. In effect, the arrangement is a five-panel miltiple ; each panel is one foot wide and the length of the multiple is equivalent to two operating positions.

The face equipment is divided into two portions. The upper portion carries outgoing circuits and the incoming and both-way circuits used during the day period ; the lower portion is reserved for concentration during the slack hours. Operating positions are divided into suites of twelve. If, therefore, an installation comprises 36 positions, any calling circuit on the second and third suites can be reproduced on the lower portion of the first suite for concentration purposes. Outgoing circuits are located in the two upper strips of the top half of the panels ; the incoming and both-way circuits are immediately below.

Each operating position is provided with :—

(*a*) Two double-ended cords in order that calls for the Supervisor or for enquiries may be extended to the appropriate position. Thus an operator may continue to answer other waiting calls without delay.

(*b*) A clearing signal and a speaking and ringing key for each pair of cords.

(*c*) A transmitter cut out key and dialling facilities.

Facilities are available for dealing with outward traffic at every position.

The capacity of the multiple is 100 outgoing and 50 incoming circuits. Outgoing circuits are multipled every two positions throughout the equipment and incoming circuits are distributed over the suites. It is in this direction that the continuous panel system differs from the three position panels upon which all circuits are multipled throughout the equipment. Normally only 25 incoming circuits will be served from a suite of twelve positions ; the circuits spread over the multiple, leaving alternate jacks and lamps out of use ; thus five circuits will be accommodated on each panel. This arrangement restricts the number of calling circuits within the field of any one operator ; the reason is perhaps obvious, but the fact should perhaps be recorded that it was found to be unnecessary and even undesirable to provide facilities to enable a particular call to be answered by one of 36 operators. Another advantage of this system is that each operator has ready access to a larger number of circuits than is possible with ordinary ancillary equipment. In the latter case two of the three telephonists operating at one panel are required to reach to an adjacent position for 100% of their calls whereas with the continuous panel system the majority of the calls are taken from jacks immediately in front of the operators.

Only three continuous panel equipments have so far been installed, one at Cardiff, one at Sheffield, the other at Manchester. The results so far obtained are entirely satisfactory ; the speed of answer has been reduced by 25% at Sheffield and by at least 50% at Manchester. In due course, similar equipment will be provided at Birmingham, Bristol, Leeds, Liverpool and other large towns.

The use of automatic working has not been lost sight of but the available apparatus is not intended for " hunting " for a period for a disengaged circuit ; moreover, there is no simple automatic device capable of making a selection over more than ten circuits. These difficulties could no doubt easily be surmounted ; ancillary equipment is, however, comparatively cheap, simple in construction and inexpensive in maintenance and there is no real need at present to embark on experiments with automatic equipment.

Special inquiry and supervising positions are not provided for small phonogram equipments. At the larger offices a combined supervisor and enquiry desk is available and separate positions are or will be fitted at the largest offices. Circuits are arranged from these desks to the outgoing multiple of the phonogram equipment together with such other special circuits as may be required.

Steps are now being taken to instal observation boards in order that the working of the larger phonogram rooms may be thoroughly tested.

It should perhaps be mentioned that at the Central Telegraph Office, London, and a few of the largest provincial offices, band conveyors are provided to carry the traffic from the incoming positions to the circulation point. At the Central Telegraph Office a band conveyor is employed to distribute outgoing traffic. Disengaged operators are required to pick telegrams off the carrier and telegrams which have been circulated more than twice in this way without finding a disengaged operator are then specially distributed by hand.

(To be continued.)

REVIEWS.

" Questions and Solutions in Telegraphy and Telephony." Grade I Examinations. By H. P. Few. (Published by S. Rentell & Co. Sixth Edition. 350 pp. Price 6s. 6d. net.)

The first edition of this book was published early in 1909. Since then five additional editions have appeared, a testimony to the utility of the book to students, especially to those studying without the aid of a teacher.

It is an unfortunate fact, with which those who have had any experience with students are only too well acquainted, that frequently a man may really have a good knowledge of his subject, well above the standard required for the examination for which he is preparing and yet fail to pass from the want of that accurate and brief style which enables the candidate to answer correctly the necessary number of questions in the time allowed. The want of this style causes far more failures than actual lack of knowledge.

This book enables the necessary examination style to be easily obtained. The student can himself attempt the questions, and then compare his answer with that given. By systematic practice in this way, anyone with the necessary knowledge need no longer be afraid of the bogy of the lack of ability to express himself in the examination room.

Full solutions are given to every question set between 1904 and 1919, and to those set in 1925. In order to keep the book within due bounds the solutions to the questions set in the years 1920 to 1924 have been omitted. This has enabled the present edition to be issued without a material increase in cost.

At the end of the book is given a selection of questions from the written examination for overseers and also a selection from the oral questions and practical tests set at the Departmental Examination for overseers and assistant superintendents.

The printing and paper are good, the diagrams are well drawn and clearly reproduced, and we can strongly recommend the book to all who are studying for the examinations with which it deals.

" Wireless Pictures and Television." By T. Thorne Baker. (Published by Constable & Co., Ltd. x + 188 pp. Price 6s. 6d. net.)

The subject of the electrical transmission of pictures, with its ultimate goal of television, is one which is of particular interest at present in view of the development during the last few years of the wireless broadcasting service.

We can now hear a theatrical performance which is taking place perhaps hundreds of miles away, but the full enjoyment of the play is prevented because the actors are not visible to us. If

we could see the stage as well as hear the words and music we should be able to enter fully into the performance.

There has been very little published in English on this subject, and consequently the book under review fills a noticeable gap in technical literature.

In the first chapter the elements of telegraphy and early attempts at picture transmission are dealt with. In the second chapter various light-sensitive cells are described. The next chapter deals with the different forms of galvanometer and oscillograph which are suitable for use as receivers for picture reproduction. In the following chapter the elements of the theory of photography are given, as far as they apply to picture transmission, and the next is devoted to certain miscellaneous devices.

The following five chapters contain descriptions of the various modern systems of picture transmission.

The ninth chapter deals with the wireless transmission of pictures, and the final chapter with the various methods by which the problem of television is being attacked, the measure of success which has been reached, and the lines along which future developments are likely to take place.

It will be seen that the book covers the whole ground, and it should be a useful guide to anyone wishing to take up the study of this fascinating subject.

We notice, however, several minor points which could with advantage be modified in a future edition.

The action of the system shown in Fig. 10 is not clear. A more explicit diagram is desirable.

On page 22 there is an error in dates. From the context either "1880" should be "1890," or else "1902" should be "1892."

On page 24 equations are given containing symbols to which, certainly, names are applied, but these names mean nothing without definition.

On page 25 the reader is assumed to know the unit in which wavelengths of light are measured, as this is quoted without explanation, but on page 31 the necessary definition is given. The definition should precede the use of the symbol.

In diagram A of Fig. 15 a battery is shown having two positive poles.

In Fig. 17 the disposition of the guard-ring G is by no means clear.

At the end of page 39 a formula involving current is given, but the unit in which the current is expressed is not mentioned, and, in addition, a numerical constant appears to be wrongly printed.

On page 158 "Fig. 84" is mentioned in the text, but there is no Fig. 84 in the book. Fig. 83 is followed by Fig. 85.

The foregoing points are, however, only minor ones, and do not detract from the usefulness of the book as a guide to the subject.

DEATH OF MR. L. M. ERICSSON.

MR. L. M. ERICSSON, the Swedish Telephone Engineer and Manufacturer, died on Friday, Dec. 17.

Mr. Ericsson was the founder in 1876 of the organisation bearing his name and therefore was the world's pioneer manufacturer of the Commercial Telephone. He commenced business in a very modest way, but being a man of keen intelligence and foresight, his business rapidly grew until to-day it is the largest telephone manufacturing concern in Europe. In this and other countries the Ericsson concern employs many thousands of workpeople.

PROGRESS OF THE TELEPHONE SYSTEM.

THE number of telephone stations working at Oct. 31, 1926, was 1,453,180. During October new stations numbered 20,751 and cessations 11,873, resulting in a net increase of 8,878 on the total at the end of September.

The growth for the month is summarised as follows :—

	London.	Provinces.
Telephone Stations—		
Total at Oct. 31	510,806	942,374
Net increase for month	3,679	5,199
Residence Rate Installations—		
Total	106,479	176,755
Net increase	1,518	2,013
Exchanges—		
Total	112	4,004
Net increase	1	7
Call Office Stations—		
Total	4,626	16,533
Net increase	34	105
Kiosks—		
Total	373	2,123
Net increase	28	76
New exchanges opened under Rural Development Scheme—		
Total	—	969
Net increase	—	7
Rural Party Lines Stations—		
Total	—	9,897
Net increase	—	—
Rural Railway Stations connected with Exchange System—		
Total	—	791
Net increase	—	4

The number of inland trunk calls made during September—the latest statistics available—was 7,871,104, an average of 302,735 calls per day. During the six months ended Sept. 30, the number of calls dealt with was 47,780,370, representing increases of approximately 4½ millions (10.6%) over the preceding half-year and 5 millions (11.6%) over the corresponding period last year.

Calls made to the Continent during September numbered 22,241 and from the Continent 25,217. For the six months ended September, the totals were—outgoing calls 131,513 and incoming calls 148,595.

The table below illustrates the growth in the Anglo-German trunk traffic since its inauguration in March last.

Month.	No. of Calls. Outgoing.	Incoming.
March 19-31	505	331
April	898	836
May	1,234	979
June	1,244	1,066
July	1,937	1,905
August	1,941	1,781
September	2,520	2,327

Further progress was made during the month of November with the development of the local exchange system. New Exchanges opened included the following :—

LONDON—Bexley Heath.

PROVINCES—Gravesend, Coventry (Automatic), Dumfries.

And among the more important exchanges extended were :—

LONDON—Clissold, Clerkenwell, Grosvenor, Malden, Mill Hill, North, Reigate, Streatham, Tottenham, Walthamstow.

PROVINCES—Barnstaple, Bourne End, Failsworth, Preston,

while 65 new overhead trunk circuits were completed, and 60 additional circuits were provided by means of spare wires in underground cables.

BROADCASTING AND THE TELEPHONE SERVICE.

SOME time ago, an interesting discussion on the linking up of Broadcasting Stations by means of land lines was opened by the Chief Engineer of the British Broadcasting Company at the Institute of Electrical Engineers, and it appeared to the writers that a few notes on the help given by the Post Office Trunk Telephone Service to the simultaneous and "special event" broadcasting service will prove of general interest.

The completion of the Gloucester Relay Station by the B.B.C. (which, and its successor, the British Broadcasting Corporation, we shall refer to hereafter as the "B.B.C.") provides an opportune moment for presenting the following notes:—

Arrangements were made to hand over every evening to the B.B.C. a network of long distance telephone circuits in order that the broadcasting stations may be linked together in such combinations as the programme requirements need.

It is common knowledge, however, that the long distance telephone system in this country was constructed primarily for the satisfactory transmission of speech, and not for the more delicate transmission of music. The two chief line characteristics required for satisfactory music transmission are:—

(1) stability

(2) high-frequency cut-off.

Of course, stability is absolutely necessary for the transmission of speech and music, but the higher frequency cut-off characteristic is not essential for speech transmission.

The frequencies produced in ordinary speech vary between 300 and 2,000 cycles per second, and so, if the telephone circuits have a frequency cut-off of not less than 2,000 cycles per second, they are satisfactory for the purpose for which they were constructed.

The transmission frequency characteristics of commercial types of telephone circuits are shown by the curves on diagram (Fig. 1).

For successful transmission of music, however, it is necessary to cater for frequencies between 100 and 5,000 cycles at least.

It may not be out of place to mention that tests have shown that many overhead circuits possess very high frequency cut-off characteristics.

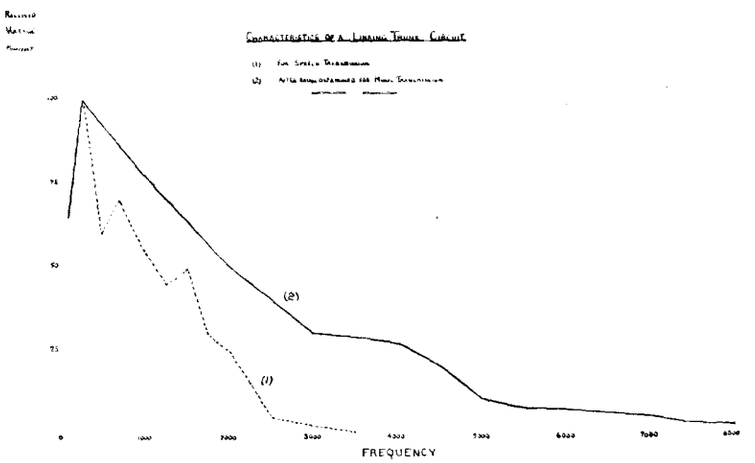


FIG. 1.

The "linking-up" system has resulted in the erection by the B.B.C. of four relay stations—London, Leeds, Glasgow and Gloucester. The stations permit of amplification being effected along the route, and maintain the ratio of the signal strength to noise to such a degree as to ensure that the received signal strength is not normally marred by extraneous noise.

In the early days of broadcasting, difficulties were experienced owing to the input energy from the B.B.C. transmitters being so small that the ratio to the normal noises of a telephone circuit was relatively low. When amplification took place at the broadcasting station the noise was amplified with the signal so that the resulting transmission was frequently very poor as a reproduction of music.

The long-distance telephone circuits used to link up the British Broadcasting Stations in this country are shown in diagram (Fig. 2).

At London, Leeds, Glasgow, and Gloucester, special attention is provided by the Post Office during the hours of simultaneous broadcasting, and the officers in charge at these places are responsible for placing suitable circuits promptly at the disposal of the B.B.C.—all extensions being made in the test rooms.

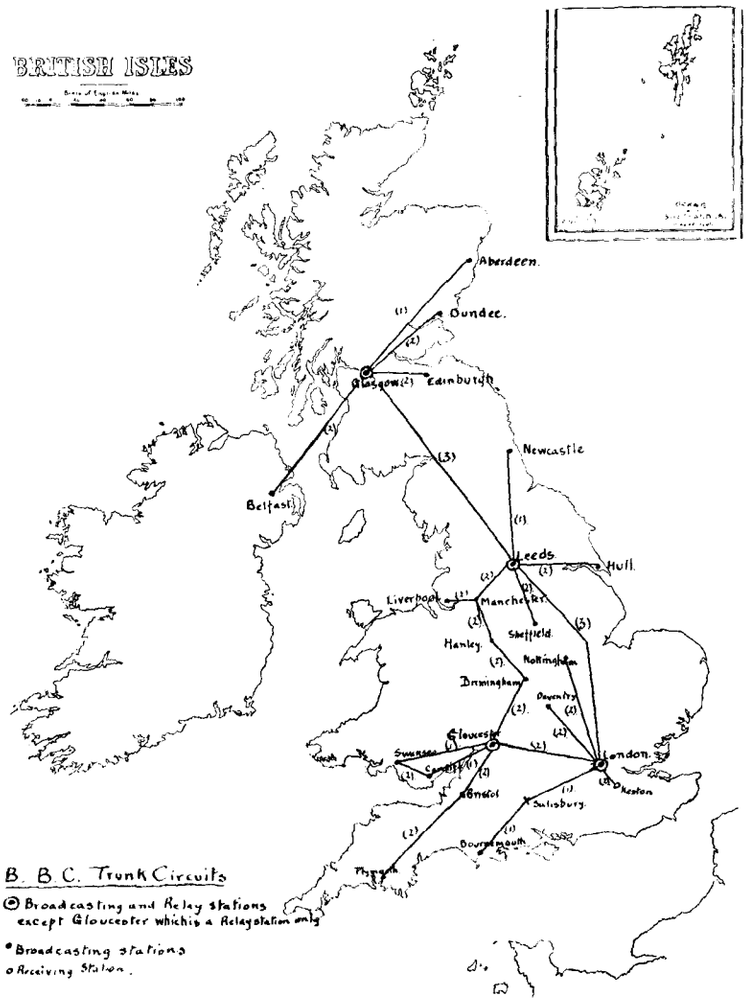


FIG. 2.

A further essential in the broadcasting service is that any circuit which becomes faulty during a transmission should promptly be substituted by a good circuit. The duration of faults, so far as the B.B.C. is concerned, is the time taken to report the faults and to replace the faulty circuits. Special arrangements have been made, so that this interval should not exceed two minutes. It will be seen from diagram (Fig. 3) that the average time taken to replace faulty circuits shows steady improvement, although it still falls short of the desired standard, and of what should be possible when the whole of the arrangements have been adopted.

In order to speed up the replacement of faulty circuits appropriated for broadcasting, provision being made at the minor centres—Birmingham, Cardiff, &c.—for the circuits used for simultaneous broadcasting to be terminated, together with the reserve circuits, on special positions, so that the exchange staff may make extensions and changes whenever they are required by the controlling centres.

It is not claimed that the lines have always been perfect, perfection being such an elusive if not impractical proposition; but it can be claimed that the facilities given to the B.B.C. have steadily improved, and it is a tribute to the efficiency of the Post Office lines that only on one occasion out of four hundred was it necessary to advise the B.B.C. that suitable lines were not available.

A few instances in which a satisfactory link has been provided by the Post Office under conditions more than usually difficult may be of interest :—

At Croyland Abbey, good transmission was effected by cutting a long trunk line near the Abbey and completing the connexion via a local subscriber's circuit.

In a garden in Surrey, the quest of the elusive nightingale taxed the ingenuity of the individual who carried the microphone attached to a trailing lead with due regard to the amenities of the herbaceous border. The success of the broadcast was ample compensation for the heartfelt expression of unpoetic thought "All through the night!"

From Aberystwyth, Insch, Marazion, and other "outside" places, successful transmission was effected, after the local obstacles had been surmounted.

From Pewsey, New Romney, and Loughborough; from the good ships "President Roosevelt" and "Mauretania"; from H.M.S. "Victory" in Portsmouth Dockyard; from cathedrals, coal mines, and bell tents, no

FIG. 3.

complaint could be made as regards quality of the transmission, even although the local circuits were linked up under conditions that were not too favourable to the engineers.

A justification for the time and effort spent in improving the arrangements for the broadcasting service may be found in the revenue obtained from the B.B.C. for leased trunk circuits and for special broadcasts. The appropriation of circuits for broadcasting employs the long distance plant at times when it would not normally be in use.

The extent to which the use of telephone circuits for broadcasting may develop is, of course, problematical, but it is conceivable that the development might increase to such a degree that would justify it being taken into account in planning additional circuits, including underground circuits with the necessary special electrical characteristics and stability, which might entail additional expense not justifiable for speech transmission.

In conclusion, it should be mentioned that the underground circuits provided between London and the Rugby Wireless Station have a cut-off frequency of 6,000 cycles, thus proving that the provision in underground cables of circuits suitable for transmission of music is quite practicable and the development of longer trunk circuits having similar characteristics may also be worth while. T. T. U.

CHRISTMAS GREETINGS TELEPHONED TO AMERICA.

On Dec. 24 the Transatlantic wireless telephone system, shortly to be opened to the public, was used to exchange Christmas greetings between officials of the Post Office and the officials of the American Telephone & Telegraphy Company and New York Telephone Company in New York. The greetings were subsequently confirmed by teletype.

COVENTRY AUTOMATIC SYSTEM.

FIGURE 1 gives a view of the manual switchroom at Coventry. Figure 2 shows the lay-out of the equipment on the two key sending "B" positions which accommodate the incoming circuits from the Birmingham Trunk, Central and Midland exchanges.

As the key-sending "B" positions embrace many of the latest developments in connexion with order wire cordless "B" positions (C.B. 10 sections), it is thought that the following summary regarding the equipment of this type of position may be of interest :—

KEYBOARD.—(*a*) *Single strip of ten digit keys with key-tops engraved with numbers 1 to 0.*—Immediately the fourth digit of a number has been keyed, the position "peg count" register (fitted on the cable turning section) is automatically operated, the digit keys are dissociated from the sender equipment and the keys are available for the next call.

The Coventry area numbering scheme for subscribers provides for a uniform number of digits and therefore a "start" key is not required.

In the event of a fault developing in connexion with any of the digit keys, the whole strip can be easily replaced by the operating staff with a spare strip which is available in the switchroom.

(*b*) *Cancel key.*—This key is fitted to the right and in line with the digit keys. It can be operated in the event of an error being discovered prior to the last digit being keyed. After the cancel key has been depressed, the whole of the number is then keyed correctly.

(*c*) *Notice panel.*—A glass panel is fitted on the left front of the keyboard and accommodates a list of four figure numbers to be keyed for calls to service points (including rural party line position).

(*d*) *Forty assignment keys in two strips of twenty with designation strips.*—The depression of the assignment key of the junction allotted associates the sender equipment with the junction and keying can commence practically at once.

(*e*) *Supervisory lamps (green).*—One supervisory lamp is associated with each junction although there is provision for two if required.

The supervisory lamp indicates whether the junction has been taken up at the Birmingham exchange and glows steadily during the whole time the connexion is held.

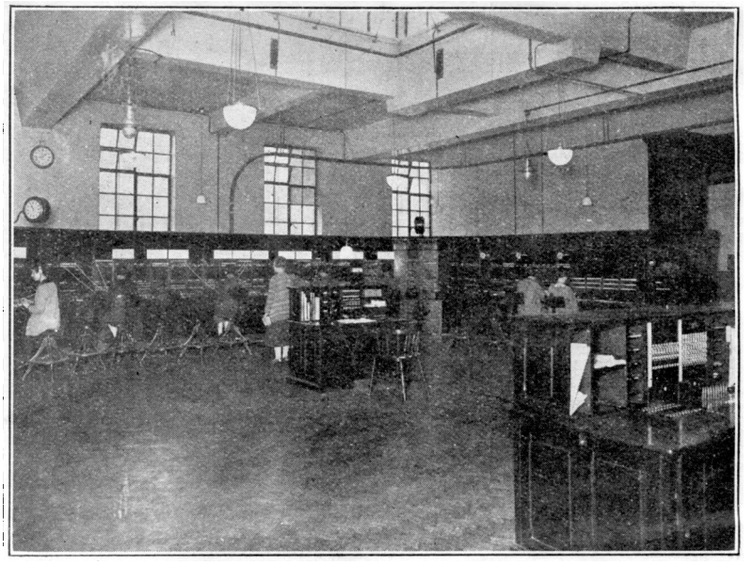


FIG. 1. GENERAL VIEW OF MANUAL SWITCHROOM.

Disconnection takes place, and the supervisory lamp darkens when the Birmingham telephonist withdraws her plug, thus indicating to the key sending telephonist that the junction is available for re-allocation.

(*f*) *Four sender finder lamps (white) with circular number labels.*—The sender finders have multipled on their banks connexions to six senders which are provided to serve the two positions.

When an assignment key is depressed a sender finder is seized, the corresponding sender finder lamp glows and the sender finder starts to hunt for a disengaged sender. Also, in the unlikely event of each of the six senders being in use or unavailable, all the sender finder lamps on each position will glow immediately the last available sender has been taken into use.

A master "sender finders engaged" lamp which will light when all the individual sender finder lamps on the position glow, is also being provided (in the pilot rail on each position) as an additional safeguard against the allotment of junctions being proceeded with prior to a sender being available.

PILOT RAIL.—(*g*) *Order wire calling signal* (*white*) are in its right hand panel. (*h*) *Outlet finder fuse alarm* (*red*) are in its left hand panel.

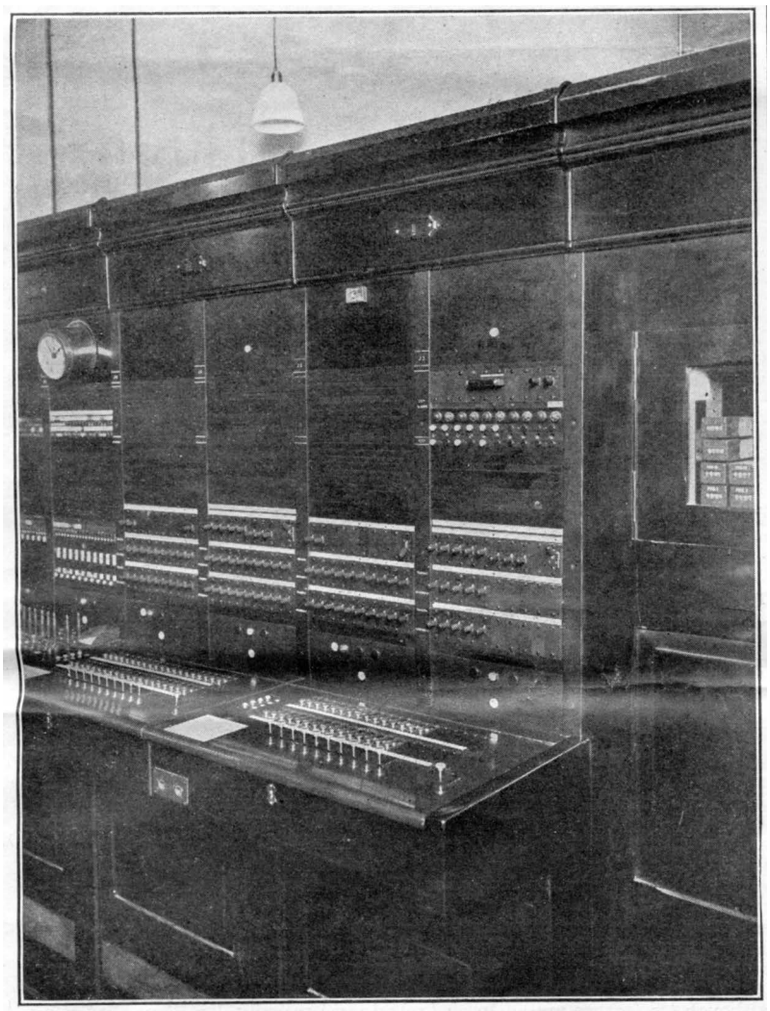


FIG. 2. LAY-OUT OF KEY-SENDING "B" POSITIONS.

PANELS.—(*i*) *Forty transfer and disconnect keys* (*two strips of ten per panel with designation strips*).—In the case of a through call for a manual exchange, the "transfer and disconnect" key associated with the incoming junction allotted is momentarily operated to the "transfer" position and this lights a calling lamp on a jack ended "B" position where the call is completed; "trunk offering" calls are similarly transferred.

On the jack-ended "B" position a jack and calling lamp associated with each of the incoming junctions is provided, and these jacks are also utilised to replace temporarily (by means of a special straight through double ended cord) a faulty incoming order wire by one of the junctions.

The supervisory lamp on the key sending "B" position continues to glow steadily until the telephonist at the jack-ended "B" position withdraws her plug.

The operation of the "transfer and disconnect" key in the disconnect position (downwards) throws the relative junction out of use and causes the supervisory lamp on the keyboard to glow steadily.

Upon a request from a Birmingham telephonist for a number to be rung on a junction already allotted, the "transfer and disconnect" key is operated downwards momentarily, the assignment key is again depressed and the number keyed.

RIGHT HAND PANEL.—(*j*) *Outlet finder change over key.*—This key is fitted on the extreme right of the panel. On the pressing of an assignment key, the first switch brought into operation is the outlet finder, via which the assigned junction is picked up and a disengaged sender found.

In order that the outlet finder may be available for periodical overhaul a duplicate is provided. The use of the two switches is controlled by the key, which is designated $\frac{\text{ODD}}{\text{EVEN}}$ and operated at the commencement of the day according to the date in the month.

(*k*) *Four sender finder keys.*—Three of these keys are fitted next to item (*j*), the fourth sender finder per position having not yet been provided. The operation of the sender finder key (the designation number of which agrees with that of the lamp on the keyboard) throws the relative sender finder out of use and causes the appropriate sender finder lamp to glow.

(*l*) *Five order wire disconnect keys.*—These keys, fitted on the left of the panel, are provided to enable the disconnection of a faulty order wire to be effected at the position.

As mentioned in connexion with item (*i*), the temporary replacement of a faulty order wire is carried out at the jack-ended "B" position where break jacks on the incoming order wire circuits are provided.

LEFT HAND PANEL.—(*m*) *Coupling key.*—This key is fitted at the right of the panel. At present only the head set circuits are coupled, but arrangements are being made to admit of the key set on one cordless "B" position being used to set up a call on the adjoining coupled "B" position.

(*n*) *Order wire re-setting key.*—This is fitted on the extreme left of the panel.

(*o*) "*Call Supervisor*" *key.*—This key is fitted next to item (*n*) and operates in an upward direction. The operation of the key causes the lamp at the top of the right hand panel to glow and actuates a buzzer. The key is restored to normal by the section supervisor.

CABLE TURNING SECTION.—(*p*) *Group registers.*—Each incoming junction is terminated on a separate first selector, and, in addition to the "peg count" register referred to under "remarks" against item (*a*), a totalling register is associated with each group of ten (or less) incoming circuits on each individual route.

This group totalling register is operated upon release of the first selector switch which is effected when the Birmingham telephonist withdraws her plug.

These group registers therefore indicate, for any period for which readings are taken, the number of keyed effective and ineffective calls received over any route served by the key sending positions.

N.B.—Position No. 1 is at present only partially equipped, i.e., for 30 incoming circuits.

REVIEW.

"*Television.*" *By Alfred Dinsdale, A.M.I.R.E.* (*Published by Sir Isaac Pitman & Sons, Ltd.* 62 *pp. Price* 2*s. net.*)

Seeing distant objects by means of electricity, either through the medium of a connecting wire or "wirelessly" through the free ether has been a long desired sequel to the hearing at a distance made possible by Graham Bell's invention of the telephone. The problem is, however, far more difficult of solution, and despite the large amount of work done on it, it is only just now approaching a really satisfactory solution. This small book gives a brief account of the various attempts which have been made to attain the goal of television, concluding with the Baird "Televisor" with which sufficient success has been attained to bring the broadcasting of actual scenes within the region of practical possibility. It is a good general account of a fascinating subject.

TELEPHONE NOTES.

A NEW telephone cable in the Baltic Sea, between Denmark and Germany, is to be laid shortly to provide for faster and more distinct telephone calls. This new cable will connect with the large underground telephone cable which Germany has recently completed, and will run via Nykoping, Falster, Gjedser, Warnemünde, and Rostock. Communication between Copenhagen and Germany has been carried out in the past through a cable containing only four wires, but this old cable could not be connected with the new telephone system. The new cable, however, will be more than ample to take care of present requirements, carrying a sufficient number of wires so that twelve telephone calls can be provided for at one time. The cost of the new cable is to be divided equally between Denmark and Germany, but the actual work of laying it in the Baltic Sea is to be done by Germany.—*Telegraph and Telephone Age.*

* * * *

According to the *Sydney Morning Herald,* the Postmaster-General's Department of New South Wales has been for some considerable time considering the one system of charging for telegrams, though so far, no definite decision has been arrived at.

* * * *

In a contribution to *Telephony* the Divisional Commercial Superintendent of the Illinois Bell Telephone Company describes a new operating procedure adopted by that Company, whereby the normal method of repeating to calling subscribers the numbers of the called subscribers' lines has been abandoned in favour of the expression "Thank you." The new method is termed "Restricted Repetition" and is reported to be very successful.

It is stated that the change has been most favourably received by the Press, and it has been proved conclusively that the new method materially speeds up the service, and does so without sacrificing accuracy.

The main reason for the change in procedure appears to be the frequent failure of subscribers to take interest in, or correct, when necessary, the "A" operators' repetition of numbers.

It is claimed that in addition to reducing the holding time on calls, the new procedure promotes a better understanding between the public and the exchange operating staffs.

* * * *

After commenting favourably on the new method whereby calls between London and Paris are charged minute by minute after the first three minutes, the European special correspondent of *Telephony* says :—

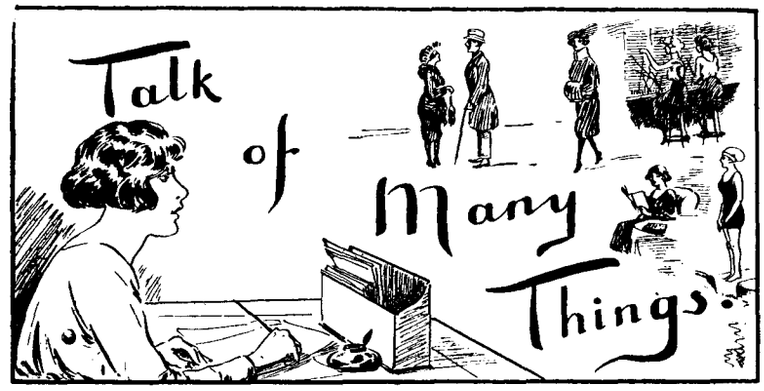
"It is not anticipated that the change will have a material effect on the revenue from the trunk service. . . . Whether the facility will be extended in the future to inland trunk calls probably depends on the success of the London—Paris experiment. The authorities have the extension under consideration, but we must confine ourselves to 'confident anticipations.'"

The problem of timing inland trunk calls is, however, a very complex one, and has long been the subject of investigation by the Department. The general conditions applicable to the long continental routes are scarcely comparable with those existing in the case of the inland trunk service, and it is difficult to forecast the nature of any change which may be made in the present timing procedure.

* * * *

The correspondence which has arisen as a result of the reference in these columns to "Automatics in Oriental Countries" must be of particular interest to all concerned with the development of automatic telephony in the Empire. It is desired to give publicity to both sides of the question, and the views of those best acquainted with the local telephonic conditions in countries with cosmopolitan populations will be welcomed. H. J. E. S.

WE TELEPHONISTS



The Walrus and the Carpenter.

I HAVE a great respect for the Walrus and his friend the Carpenter. The Walrus must have been a brilliant conversationalist, and I think that the Carpenter must have been an excellent listener although he was getting on with the oysters all the time. You will remember the verse :—

"The time has come, the Walrus said, to talk of many things,
Of shoes and ships and sealing-wax, of cabbages and kings,
And why the sea is boiling hot, and whether pigs have wings."

It is seldom that we meet with people whose range of casual conversation is so wide and so varied. It would be difficult for anyone lacking the extensive and peculiar knowledge of Sherlock Holmes to join intelligently in such a conversation. We "dear Watsons" would have only a minimum of muddled information on such topics scattered loosely through a disorderly mind. Those of us who shone in shoes would be wrecked in ships. Sealing-wax would cause most of us to go to pieces although gardeners might take heart from cabbages. All that we—I at any rate—know of kings could be expressed in the phrase "William the Conqueror, 1066"—but kings seem at a discount in these days. Perhaps the scientists would have the best of it for they would delight in proving that the sea was in fact boiling hot and that, contrary to popular conception, pigs really have wings.

Have you ever noticed how these great and learned men love to confound our simple beliefs? They allow us to cherish some particular notion on some commonplace thing for years and then they suddenly confront us with some absolutely contradictory theory which destroys our faith in mountains and mustard seed. They will, for example, commence artlessly by saying that Ludgate is supposed to be so named after its builder—King Lud—to which we say "Yes, of course." We have often pictured King Lud to ourselves—rather a jolly old fellow we should think, bluff, hearty, large of person and manner, with a flowing beard and a golden crown,—in short just such another as the dear friend of our youth, old King Cole. But, says the antiquary, that supposition is entirely wrong; actually the name is derived from the Saxon for postern. Alas, and so our vision of King Lud vanishes into thin air. Although (so far) we are left with Ludgate, we scarcely dare hope that King Lud ever existed, and it is safe to assume that if one proves his existence another will disprove it. Thus do they argue to and fro and "Tis, 'Tisn't" like so many children while we, their victims, look on in bewilderment. In the circumstances our best course is, I think, to let the Walrus carry on the conversation, while we get on with the oysters. PERCY FLAGE.

Snakes and Ladders.

Whilst watching my young nephews playing at "Snakes and Ladders" the other day, I was suddenly struck with the similarity of this game to the "Game of Life." For a little space we go calmly on and then suddenly without any warning we come to a ladder, and in the exhilaration of the moment forget all about the snakes, the pitfalls and the snares, and we taste to the full the joy that comes to us (in various guises) however short-lived it may be. And so, as I watched them playing, I saw the dice box rattled again and the dice thrown—this time the number disclosed brought the thrower a number which landed him right on to the head of one of those nasty creeping reptiles, and down, down, down he had to go until he was almost as far away from his goal as when he started the game.

My friends, life holds a deeper and more wonderful New Year message for us than this—but, sometimes, it does seem that the snakes and the ladders are very real things.

How often have we set our hearts on some particular thing, and sometimes seemed to be so very near the goal; perhaps we have got within a few throws of "home," and then we have to go back again, with bitterness in our hearts and a sense of frustration and defeat. But there is always this thought to cheer us on—Let us go back to the two little boys playing their game; they *know* they will get to the goal some time or other, how ever many times they go up the ladders and down the snakes. Suddenly they throw the dice, and oh joy, just the right number—goal!

There's only one rule, and that is to keep on "Playing the Game."

L. R.

To Our Contributors.

Well Done, Sydenham.

It is a year ago since we made an appeal to *all* Exchanges to resolve to send in contributions regularly.

"And did responses come?
Oh, no; hey nonny no,
For nearly all were smitten dumb
It seems, a year ago."

There is one notable exception so far as the Exchanges are concerned, and that is Sydenham, where Miss G. M. Turner not only writes for this column frequently herself, but persuades others to do so. We thank Miss Turner very sincerely for her loyalty and help.

We would thank, too, very heartily, Percy Flage, that most regular of our contributors—whose pseudonym scarcely does justice to his never-failing fount of dry but always kindly humour. What play he would make with the rich store of humorous happenings that must be open to our telephonist colleagues, in their daily contact with a public whose knowledge of the working of the mechanism they set in motion must be as extensive and peculiar as Sam Weller's knowledge of London. Here, surely, is a theme which could make this page a serious rival of *Punch*; and we commend it to our colleagues in "the field."

But we do not forget our occasional contributors—always welcome,—for it is only in so far as our page expresses the diversity of thought of our great Service that it can make the appeal it might.

To all our contributors then, regular and irregular, present and potential, we wish a happy Christmas and New Year, with plenary inspiration for their pens.

Contributions to this column should be addressed: THE EDITRESS, "Talk of Many Things," *Telegraph and Telephone Journal,* Secretary's Office, G.P.O. (North), London, E.C.

MANCHESTER DISTRICT.

ANNUAL REPORT ON TELEGRAPHS AND TELEPHONES.

THE past year has been a period of much difficulty, consequent on the depression arising from the coal strike, but it is pleasing to record satisfactory progress in nearly every direction.

Automatic Telephones.—Good progress has been made with the arrangements for introducing automatic working in the Manchester District. The laying of underground ducts for the accommodation of cables to the new building in Chapel Street has proceeded steadily, and multiple-way ducts equivalent to over 70 miles of single duct have already been provided. A further section involving an equivalent of over 40 miles of single duct in the heart of the city will shortly be commenced. Unfortunately the construction of the main building in Chapel Street, which was well in hand early in the year, has been retarded owing to the supply of steel and bricks being delayed as a result of the coal dispute. The buildings for the new subsidiary automatic exchanges at Ardwick, Collyhurst and Moss Side have also been adversely affected by the coal dispute.

New or Improved Exchanges.—Complete new exchange equipments have been provided and brought into use at Knutsford, Openshaw and Whaley Bridge, and substantial additions have been made to the exchange equipment at sixteen exchanges, including Cheetham Hill, Chorlton, Failsworth, Gatley and Trafford Park. An additional exchange will be opened at Stalybridge early in December which will relieve the existing Ashton-under-Lyne exchange pending the provision of a new automatic exchange at Ashton. Arrangements are in hand for providing new equipment or new exchanges at Bramhall, Heaton Moor, Pendleton, Rusholme and Wilmslow, and for the opening of an automatic exchange at Shaw.

Telephone Progress and Increasing Number of Telephones.—During the year ended Sept. 30, 1926, 10,679 new telephones were fitted; after allowing for cessations this shows a net increase of 5,475, or 7¾%. The number of telephones increased from 32,946 in September, 1912 to 76,433 in September, 1926, a growth of 132% in 14 years. The provision of additional underground cables required to meet the demand for new circuits is proceeding steadily; and, in general, new services can now be given in the majority of cases within one or two weeks from the date of the order. Many letters have been received expressing appreciation of the speedy provision of new telephones in the district.

Isolated cases of unavoidable delay occasionally arise owing to the spare underground plant being used up through rapid growth in different localities. In such cases prompt steps are taken to lay new cables.

Underground Cable Extensions.—During the past year the underground wire mileage has increased by 53,412 miles. In 14 years the total has risen from 75,476 miles to 299,538 miles, an increase of 224,062 miles or 297%. These figures include the considerable additions made to the underground plant at Oldham. To supplement existing services new main cables have been provided from Manchester to Bolton, Blackburn, Bury and Burnley; additional cables will shortly be laid from Manchester to Rochdale, Liverpool, Huddersfield, Ashton, Middleton, Heaton Moor, and Stockport.

Telephone Repeaters.—Several additional long-distance circuits from Manchester and the surrounding industrial areas to London, and other important centres, have been brought into use by means of the various repeater stations associated with the main underground cable routes. The temporary repeater station at Manchester is equipped with 65 repeaters, of which 53 are already in use. Permanent equipment of the latest type will shortly be provided in the Head Post Office for 90 repeaters, and accommodation has been arranged for an ultimate provision of 300 repeaters.

Telephone Traffic.—The number of effective trunk calls and telegrams during the year ended Sept. 30 last was 5,794,288, and increase of nearly half a million. Local effective calls during the year ended June 30, 1926, numbered 56,946,645, an increase of over 10½ millions on the previous year's figure.

Complaints relative to service and plant defects continue to decrease. The average number of written complaints received monthly during 1926 is 197 as against 288 during the previous year. The average time taken by a telephonist to answer subscribers' calling signals during 1926 was 5.7 seconds as against 6.0 seconds during the previous year, and there is a tendency towards further improvement.

Street Kiosks.—These have increased from 119 to 193 during the year. The extensive use made by the general public of the facilities is evidence of the growth of the telephone habit and shews how much the kiosks are appreciated.

Phonogram working.—A new Phonogram Room has been opened at the Manchester Office and the latest type ancillary panel board has been introduced. During the short time the board has been in operation it is clear that the improved facilities for handling the work will be beneficial to those subscribers who telephone their telegrams for onward transmission. The speed of answer is extremely rapid and we hope to avoid those irritating delays which occurred when a subscriber was held up until a telephonist was disengaged.

Private Automatic Branch Exchanges.—Considerable progress has been made throughout the district in the transfer from manual to automatic working of internal Private Branch Exchanges. In all cases where the transfer has been made, the subscribers have expressed their appreciation of the utility and the value of the service.

Telegraphs.—The possibilities of voice frequency telegraph circuits between Manchester and London are being investigated by the Post Office Research Department, and it is expected that an experimental circuit will be installed shortly to try out the system.

Manchester Civic Week.—The Civic Week demonstration at the York Street premises was a success. 1,160 subscribers and telephone users visited the display and the majority were also shown over the manual exchanges. From an educational point of view the trouble taken was considered to have been well worth while, as many features of a telephone exchange were a complete surprise to most telephone users. No small part of the public interest in the exhibition was due to the example set by the Chamber of Commerce in making a corporate inspection of the exhibits.

JAMES G. MADDAN. *Postmaster-Surveyor.*

W. J. MEDLYN. *Superintending Engineer.*

Nov. 26, 1926.

LONDON TELEPHONE SERVICE NOTES.

Telephonists' Society.

ON Dec. 3, 1926, the Society held its third meeting of the session, when Mr. H. G. Corner delivered a delightful lecture entitled "Some thoughts on the Telephone Jubilee." The hall was very full and those who were fortunate enough to be present heard a most interesting address. It opened with a realistic description of London, town and folk, at the time when the first telephone patents were applied for in 1876, and the history of the development of the telephone industry in this country was traced from that time up to the present.

Mr. Corner remarked upon some of the events which marked the passing of the Jubilee Year. The closing of Bank Exchange early in the year marked the passing of an early type of exchange equipment, and the working of trial tandem equipment in City Exchange brought automatics into the practical scheme of things in London. He referred also to the experimental transmissions between London and New York, and commented upon the advance made in intercommunication with European countries. Truly a very remarkable year in the history of telephony.

The historical aspect of Mr. Corner's address was most instructive, but his review of the more personal side was most entertaining and provided him with opportunities for illuminating his remarks with many shrewd and witty comments. True humour has always an element of reality, and his closing sally, that in the old days when technical qualifications could not be looked for in new entrants the superior posts were filled by candidates who could wear clean collars without appearing conspicuous was hailed with delight.

An interesting discussion followed, during the course of which many reminiscences were related.

The next event of the session is the annual dance on New Year's Day, and serious business will be resumed on Friday, Feb. 4, when Mr. W. Glenny will read a paper on "Contract work as affecting the Traffic Branch," followed by a paper by Miss A. M. Kingshott on "The Telephone Operating School."

* * * *

In the Dark.

It was a dull morning, very cold with a fog overhanging the City, and one was glad to reach the warmth and light of the exchange building. Business, and that means telephone traffic, was getting into its stride when the electric light failed. For half a minute or so the darkness was relieved only by what, in these circumstances, appeared to be the fairy lamps of calling and supervisory signals. Then the emergency lights were switched on and the switchroom was bathed in a sort of twilight. The work of putting the traffic through was now commenced, but the speed of operation was slowed down by the semi-darkness. In the meantime all the electric light switches, save one, were turned off so that there should be no complications in case the failure was due to a blown fuse. So the exchange carried on for five minutes. In the switchroom it seemed much longer, and to the Engineers whose business it was to attend to the failure it must have seemed that hours had passed. Then a welcome exclamation of a suppressed "O—h" as the solitary light which had been left switched on announced the restoration of the electricity supply. Quickly the other switches were turned on and the emergency lights dimmed and so passed an incident, one of the very few, which from time to time may put us out of our stride.

* * * *

Charity.

The women staff of the London Telephone Service figured prominently at the Bazaar held on Nov. 30 and Dec. 1 and 2, at Spring Gardens Galleries in aid of the Elizabeth Garrett Anderson Hospital Extension Appeal Fund, two stalls being stocked and staffed by them. The Exchange Staff, under Miss Cox, had a stall of table delicacies, and the staff in the Controller's Office, under Miss Liddiard, provided the china stall. Friends of both turned up in large numbers and assisted in depleting the stocks. This Bazaar, like the Hospital it was in aid of, was organised and run entirely by women, though men friends were welcomed as purchasers, and the stalls were stocked with useful rather than ornamental commodities. Reminiscences of Wembley appeared at the Empire stall, while famous sportswomen ran the sports stall, lady novelists the book stall, and so on.

The women staff in the Controller's Office subscribed £125 to purchase stock for the stall, and when all expenses were covered a cheque for £146 was handed over to the hospital.

The Exchange Staff did well with their table delicacies, the net profit of the stall being £118.

PERSONALIA.

LONDON TELEPHONE SERVICE.

Resignations on account of marriage:—

Miss E. R. LANDLES, Telephonist, of Harrow Exchange.
Miss E. V. SHRIMPTON, Telephonist, of Harrow Exchange.
Miss M. MORRIS, Telephonist, of Harrow Exchange.
Miss E. M. COOPER, Telephonist, of Central Exchange.
Miss E. C. EDMONDS, Telephonist, of Central Exchange.
Miss C. S. MATTSON, Telephonist, of Trunk Exchange.

GLOUCESTER.

ON Nov. 6, 1926, Mr. H. B. CARROLL, a member of the Liverpool Traffic Staff, completed a period of some 19 months' detached duty at Gloucester, and, at a representative meeting, prior to Mr. Carroll's return to his headquarters, Mr. R. S. Grosvenor, Traffic Superintendent, on behalf of the local Traffic Staff, presented to him an expanding suitcase and an Eversharp pencil.

Before making the presentation, Mr. Grosvenor expressed the gratitude of all members of the staff for the valuable assistance rendered by Mr. Carroll during the period of his stay in Gloucester. Mr. Carroll, he said, took with him the good wishes of his Gloucester colleagues, all of whom hoped that his enthusiasm and ability would soon receive well-deserved recognition.

Appreciations of Mr. Carroll's contribution to the arduous work of the section and regrets at his departure were also voiced by Messrs. Pirie, Raymond, Dance, and Miss King.

After returning thanks for the presents and expressions of goodwill, Mr. Carroll said that whatever the measure of assistance he might have rendered, the task had been made considerably easier by the team spirit which had pervaded the section. He had found the experience of the work in a comparatively small district most beneficial and although his future official interests must of necessity be centred in Liverpool, he should always retain a personal interest in the welfare of, and pleasant memories of his associations with, the Gloucester Traffic Section. He was convinced that the only solution to the existing difficulties in Traffic offices generally was to be found in the effacement of individual self-interest and the fostering of such a spirit of close co-operation between the members of the staff as he had found at Gloucester.

OBITUARY.

WE regret to record the death of Miss H. A. Ellis, Travelling Supervisor, Chester District, on Dec. 11. Miss Ellis, who travelled in the Staffordshire and East Cheshire Section, had had thirty-two years' experience of telephone work, having enlisted with the old National Telephone Company in 1894. Prior to her last appointment she was in charge of the Newcastle (Staffs.) Exchange, where she was held in high esteem and respect. As Travelling Supervisor, she was most efficient and conscientious in the discharge of her duties, and her unfailing courtesy and kindness won for her a host of friends, by whom she will be greatly missed. Miss Ellis had borne severe pain and suffering with great fortitude for many months.

Printed by A. P. BLUNDELL, TAYLOR & Co., 171-173, Upper Thames Street, London, E.C.4, and Published by the EDITING COMMITTEE (JOHN LEE, J. J. TYRRELL, W. A. VALENTINE, and J. W. WISSENDEN), General Post Office, North, London, E.C.1.